DESIGN OF A SEWER AND WATER SYSTEM FOR KIMBERLY, WISCONSIN

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THESIS

THE DESIGN OF A WATER SUPPLY AND SEWER SYSTEM FOR THE VILLAGE OF KIMBERLY WISCONSIN.

Scope of Thesis:-

It is the intention of the writers of this thesis to present an outline of the steps taken to prepare a complete set of plans and specifications for a sewer and water system for the village of Kimberly, Wisconsin.

The steps are as follows:-

1. Obtaining the Wisconsin State Board of Health code and laws regulating expenses.

2. Preliminary survey.

(a) Profiles of all existing streets and alleys.

(b) Topography of unplatted sections and adjacent sections draining into the village.

(c) Topography of selected site for disposal plant.

(d) Location map of all houses and buildings.

3. Contour map.

4. Preliminary study for drainage.

(a) Selection of outlets.

(b) Adopting lines and profiles.

5. Design of storm sewers.

(a) Division of drainage areas supplying street inlets.

(b) Calculation of areas and quantities reaching inlets.

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(d) Details.

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(a) Adopting trunk lines and profiles.

(b) Condemnation proceeding.

7. Design of sanitary sewer system.

(a) Estimating quantities of sewage.

(b) Sizes of pipe.

(c) Details.

(d) Disposal.

8. Preliminary study for water supply.

(a) Source of supply.

(b) Pumping system.

(1) Location.

(2) Storage.

(3) Pumps.

9. Design of water system.

    (a) Lines and sizes.

10. Specifications.

Wisconsin State Board of Health Code:-

The first step was to secure a copy of the Wisconsin State Board of Health Code, and to determine all the points therein that might have bearing on the notes to be taken in the preliminary survey. The main point noted in this case was that all installations should be of the separate system type and that some method of disposal had to be made. This meant that all the domestic sewage had to be conducted to one point and allowances made for future commercial sewage disposal. Many minor details were also noted which have been set forth in the Engineer's Report.

Preliminary Survey.

An inspection of the village was first made to pick out probable sites for a disposal plant, and gain an idea of conditions as they existed.

Two sites were looked over, one at the mouth of the ravine along the railroad track, and the other in a depression at the east edge of the village on the river bank. Subsequent study decided the second site as being more suitable.

The present sewer system, which was put in as a combined one, was looked over.

It was decided to turn this into a storm water system, and install entirely new lines for sanitary usage. Plans for the old system were obtained.

A glance at the filthy condition of the river was sufficient to satisfy all doubts as to the usage of its waters for water supply and a subsequent tour of the nearby villages showed all of them dumping their sewage directly into the river. Two deep wells belonging to the paper plant were noted and data on their past usage obtained. An inspection of the small water supply system in the village was made and several houses were visited to ascertain conditions therein.

Next the field work of actual surveying was undertaken, special care being given to locating property lines which sewers might cross. All data called for in the outline on the preceding pages was noted and those houses not located on a map furnished by the village were tied in.

Special attention was given to the existing sewer system, locating all man holes and taking elevations of same. Surfaces of all streets were likewise noted. Drainage conditions were talked over with old inhabitants of the village.

Contour Map.

From the notes taken in the field a contour map was prepared on a scale of one inch equals two-hundred feet as called for by the Code. Streets and existing sewer and water system were located thereon and the elevations of the present sewer system noted. From data furnished by the U.S. Engineer at Milwaukee the high and low water marks of the river were obtained with the conditions of the river and these were marked on the map.

A special contour map was made of the disposal plant location adopted, this to an enlarged scale, and with it, the land along which the sewer main was to approach the location.

Preliminary study for Drainage.

As the general slope of the land was towards the ravine along the R.R. track it was decided to have outlets here. In order to save on the digging it was also decided to have an outlet in the valley west of Sunset Point.

Lines were decided according to the lay of the land from the profiles of the streets, care being taken to accommodate all street intersections where inlets were needed. Main lines followed low streets with continuous drop. Profiles were then prepared.

Storm Sewers.

It is to be noted that the state Code has no requirements for storm water system except that it be in no way connected with the sanitary system and that it be connected in a way as to prevent water backing into the homes.

The unit of design adopted was one inch of rainfall per hour over small areas reaching inlets undiminished. From the contour map and road profiles especially small areas of drainage to the located inlets were sketched out and values of areas were determined by planimeter as follows:-

Section	Area Sq.Ft.	Cu.Ft.per Sec.
A	40,000	.74
B	74,000	1.37
C	93,000	1.72
D	13,000	.24
E	84,000	1.55
F	35,000	.65
G	48,000	.89
H	44,000	.82
I	102,000	1.90
J	110,000	2.04
K	285,000	5.28
L	230,000	4.26
M	175,000	3.24
N	130,000	2.41
O	90,000	1.73
P	170,000	3.15
Q	102,000	1.90
R	140,000	2.60
S	54,000	1.00
T	109,000	2.02
U	100,000	1.80
V	150,000	2.80
W	95,000	1.80
X	76,000	1.45
Y	34,000	.63
Z	65,000	1.20
AA	170,000	3.15
BB	63,000	1.20
CC	30,000	.60

TABLE FOR DETERMINING SIZE OF PIPE.

Loca.	Cu.Ft. per sec. deliverd.	Cu.Ft. per sec. total.	Sec.	Size	Vel. per sec.	Grade
B-J	.24	.24	D	12	2.5	.003
J-I	.82	1.06	H	12	2.5	.003
I-A	3.18	4.24	XO	18	3.0	.003
1A-	1.72	5.96	C	24	4.0	.003
2-A	1.37	1.37	EC	12	2.5	.003
H-I	1.73	1.73	O	12	3.0	.005
C-M	3.15	3.15	P	18	3.5	.004
M-N	1.90	5.05	Q	18	3.0	.003
N-O	2.60	7.65	R	24	4.0	.003
O-P	1.63	9.28	YS	24	6.5	.008
P-F	2.02	11.30	T	24	6.5	.008
R-O	.63	.63	Y	12	2.5	.003
T-S	6.00	6.00	UVCC	18	4.5	.006
S-1	0.0	6.00		18	4.5	.006
1-G	1.80	7.80	W	24	4.0	.003
G-F	1.20	9.00	Z	24	4.0	.003
F-Out.	14.45	23.45	AA	36	6.0	.004
D-Out.	4.10	4.10	1/2-K	12	2.5	.003
1-E-Out.	4.10	4.10	1/2-K	12	2.5	.003
K-Out.	3.24	3.24	M	18	3.0	.003
L-C-Out.	4.26	4.26	L	18	4.0	.005

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Sizes of pipe taken from table in Folwell's "Sewerage."

In determining sizes of pipe nothing below 12" was used. The sizes as shown are not those actually called for by design, these being from 6" to 12" smaller, but old inhabitants say that the land under development is frequently flooded in the spring so sizes have been increased proportionately to take care of this.

It will be noted that no attempt was made to utilize the 36" C.I. culvert under the railroad track near Kimberly Avenue, this being merely connected to the culvert under Kimberly Avenue by a 36" pipe for future filling in of the hollow there. The reason for not using this culvert is that it serves a considerable area south of Kimberly Avenue and it was found out that the culvert is unable to carry off the spring run off, often causing the hollow to be flooded. Another culvert under the railroad where Sunset Avenue crosses it is proposed to take care of the area in Sunset Point cut off.

Standard Details were used as shown on detail plan. The inlets recommended are of the type as giving cleanest crossing and least step at curb where pedestrians crossed .

Sanitary Sewers.

In considering the lines for the sanitary sewers the following points were kept in mind; ie- General Topography, Kimberly Avenue and Main Streets being concrete the necessity of crossing these

streets as few times as possible and keeping sewers out of same, and keeping off private property as much as possible.

Two lines were tried for the main sewer, one leading to the valley along the railroad and one to the depression on the river bank at the east of the village. The latter was adopted.

In connection with the adoption of the latter it was noted that a corner of a bit of private property had to be crossed- located west of the Mill. As the owner of this property happened to be particularly set against using his land, condemnation proceedings for securing strip of land to accommodate sewer were recommended to be gotten under way. Permission was secured from the Mill to utilize their property and the strip along the railroad track as the proposed line shown required.

DESIGN SANITARY SEWERS.

125 Gals. per capita per day — Factor Safety = 2

50% for daily fluctuation — 5 Persons per family
25% leakage ground water

40 per Acre

Total = 220 Gals. per capita per day

ocation	Popu.	Gals. per day	Cu.Ft. per min.	Factor Safety	Total	Grade	Size	Length
.Br.								
lk-5	115	25,300	2.34	4.68	4.68	.3	8"	522
.Blk-6-7	40	8,800	.82	1.64	6.32	.5	8"	640
lk-4	95	20,900	1.94	3.88	10.20	.3	8"	512
lk-3	230	50,600	4.70	9.40	19.60	.3	8"	1550
iddle Br.								
. - 6)	35	7,700	.71	1.42	1.42	.4	8"	375
. - 7)								
.-6)	50	11,000	1.02	2.04	2.04	.5	8"	280
.-9)								
- W.	20	4,400	.41	.82	4.28	.4	8"	265
- N.	30	6,600	.61	1.22	1.22	.7	8"	230
t.Lot 20-21 Blk-8	-	-	-	-	5.50	1.2	8"	171
lk-8-W.	65	14,300	1.33	2.66	2.66	.8	8"	600
lk-8-E.	60	15,400	1.43	2.86	11.02	.38	8"	390
lk-11	125	27,500	2.56	5.12	16.14	.38	8"	880
ain 25) 12 N.)	95	20,900	1.94	3.88	5.12	.71	8"	307
ower Branch	560	123,000	11.38	22.76	22.76	.48	8"	4,700
pper . E. Branch	100	-	-	-	.82	.3	8"	1,205
Main edg.to John Hill	1,650	578,000	53.5	-	53.5	.15	15"	700
Main John Sid.- Main Sid.	2,505	750,000	69.5	-	69.5	.15	15"	327
to End 2ndSt.M.	4,300	1,290,000	120.8	-	120.8	.15	15"	-
to Maple	1,160	-	-	-	-	-	10"	
Maple to Edge Vill. to Kim. Ave.	2,560	-	-	-	-	-	12"	

The sizes of pipe in Main through Mill from Main Street on were enlarged to accommodate future park buildings and unforseen discharging from Mill. Sizes on low grades were also enlarged per Code.

Details are standard as shown. The flush M.H. is one recommended as giving the least trouble, patent ones being continuously heard of as leaking and flooding.

A talk with the Sanitary Board of Health of Wisconsin established the disposal requirements as being of a settlement tank and sludge beds only. The tank adopted is one in use by the U. S. Government Housing project and was approved by the Board. Sludge beds were located on the edge of a fill made by the railroad, the material in the fill being especially adapted for allowing filtering of tank effluent.

Water Supply.

As mentioned before, the filthy condition of the river warranted no consideration of that as a source of supply. A geologist of a university nearby was called upon to furnish a report of geological conditions in the district relative to water supply. From his reports and recommendations the deep wells were decided upon and located, the location being with reference to the pumping station.

This was located with the following points in mind; central location and cost of property. It is usual also to consider high ground, but in this case the variation of ground elevation is small so this was neglected.

As the lift of the water would be high and the air lift was to be utilized from the wells, it was decided to install an impounding reservoir near the pumping station, which besides giving better pumping conditions would also serve for storage. Next the size of the elevated steel tank was decided on. This was chosen rather large in view of the fact that the mill had its own supply but it was realized the mill might call on the village in the future. Fire consideration determined the size of the reservoir, a two-hour fire being considered.

Considerable dealings with pumping concerns regarding lowest prices and installation led to the adoption of pumps as shown in Engineer's Report.

Fire requirement governed the theoretical design of the water system, but as is usual in a small village, restrictions in money led to the reduction in sizes to those more commonly used. Using a fire demand of 750 gal. per min. a 10" pipe should be used on all main streets, but a generally adopted

modified system was decided upon.

This is known as the " Gridiron System." The general size of the pipe is 6" used with 8" on every third or fourth street, and 4" on cross streets. Every third street was used here in view of the fact that the water to be used is extremely hard and reduction of pipe sizes was looked forward to due to deposits. One ten-inch main is recommended as it is quite evident the village would soon expand toward the east.

As numerous connections will be made from mains to houses in the future, necessitating repeated digging up of mains, it was recommended that these be located in the parking strips where they are easiest for access, with least injury to permanent improvements- ie. paving. Connections to far side of street from parking strip used can be made by boring under street.

Specifications were prepared from consulting numerous other specifications and fitting them to this project.

REPORT
TO ACCOMPANY PLANS AND SPECIFICATIONS TO MADISON FOR APPROVAL OF PROPOSED WATER AND SEWER SYSTEMS FOR THE VILLAGE OF KIMBERLY WISCONSIN

MUNICIPALITY:

The Village of Kimberly is located on the south bank of the Fox River about three miles east of Appleton. The Appleton - Little Shute Highway runs through the center of the Village and is known as Kimberly Avenue in the Village Limits.

Kimberly owes its existance to the presence of the Kimberly-Clark Company's Paper Mills within its limits. These are located on the bank of the river.

At present the settled and subdivided part of the Village is divided into three sections:

1. The oldest section located close to the mill; bounded by Kimberly Avenue on the south, the C. & N. W. Ry. industry track on the west, the river on the north, and the alley east of Elm Street prolonged on the east. This section is fairly well populated but by means dense.

2. A section of later date lying south of Kimberly Avenue to the southern limits of the Village and between the C. & N. W. Ry industry track and the east boundry of the Village, including too a recent subdivision north of Kimberly Avenue along the east boundry of the Village. This section is but sparsely settled.

3. The newest subdivision known as Sunset Point, lying between the river and Kimberly Avenue and west of the industry track. This section is under development and is not settled at all.

PRESENT DEVELOPMENTS:
WATER SUPPLY

The Mill has a water supply of its own from a deep well located in the well close to the river. The Kimberly-Clark Co. furnishes the hotel and several private houses close by with water direct from the river for flushing and washing purposes only. It is planed to cutout the river supply entirely, wash and treat the present pipes so they may be utilized for the new system.

SEWERS;

A combined system has been installed to the extend shown on the accompanying map and connections have been made to a number of houses. These connections merely take care of the kitchen wastes. The Mill empties its wastes into this system near its outlet which consists of a forty-eight inch concrete pipe leading directly into the river.

SEWERS: (Cont'd.)

The hotel has a small sewer emptying directly into the river into which both kitchen and toilet wastes are directed.

There is a private line for the houses in the block between Sidney and Main Streets north of Central Avenue, emptying by the bridge. The house to the west of Sidney Street at the bridge head also has a private line. These take care of kitchen wastes only.

STREETS:

Kimberly Avenue from the east boundry of the Village to a a stone about seven hundred and sixty feet west of the industry track and Main Street from Kimberly Avenue one thousand six hundred and twenty feet north are concrete with curbing and inlets to sewer. The rest of Kimberly Avenue and Main Street further north is Macadam, Main Street having integral concrete curb and gutter and Kimberly Avenue having ditches only.

The rest of the streets in the Village excepting Sunset Point are merely graded and cindered with catch basins where shown on the plan and having no curves. The streets of Sunset Point are being graded.

POPULATION:

The present population is one thousand three hundred, increasing about one hundred per year. In view of present developments and the fact that considerable numbers of the employes at the Mill do not live in Kimberly, it is estimated that the yearly increase will be exceeded considerably, bringing a possible population of five thousand twenty five years hence.

INDUSTRIAL ACTIVITIES:

In as much as the present well in the Mill does not satisfy the demands upon it it is believed that the Village supply will be called upon at times, for which due provisions have been made.

PRESENT PROPOSED DEVELOPMENT:
WATER SUPPLY
SOURCE OF SUPPLY

Deep artesian wells in the Potsdam Sandstone Layer under Kimberly from three hundred to seven hundred feet deep underground; five hundred feet being the estimated depth at which desired water may be obtained.

From one to three wells may be required depending upon the yield. It is estimated each well yield from two hundred to six hundred gallons per minute. At present there is no well of that depth near Kimberly to test. Each weld is to be cased to a point near the position from which the water is to be derived; a double casing through the glacial drift being recommended. Veins yielding poor water are to be reamed and cemented. A sixteen inch OD pipe will be used to bed rock approximately fifty feet, a twelve inch OD pipe from the surface of the ground approximately three hundred feet and a ten inch OD pipe from the three hundred foot point to the finish.

SOURCE OF SUPPLY (Cont'd.)

The water in the Potsdam Strata is exceedingly hard but it is hoped that one of the courses of excellent white quartz sand, known to be present in the Potsdam Strata, may be reached and by the method described all bad layers excluded. It is estimated the mineral contents may be thus lowered to about four hundred parts per million.

To attain the above it is necessary to carefully watch the sinking of a test well and this will be the first step.

PURIFICATION:

No purification is deemed necessary excepting perhaps individual water softening apparatus which may be installed in the homes.

DISTRIBUTION SYSTEM:

All pipe of Standard American Water Works Association class "B" and specials of same.

	4"	6"	8"	10"
Standard wt. per 12'	360	400	570	785
Tons - Sunset Point(3)	17.5	177.5	108.7	-
" Village (dense)(1)	34.4	87.4	27.9	96.0
" " (sparse)(2)	81.5	180.0	181.8	54.8

PUMPING EQUIPMENT:

An airlift system will be employed to lift the water from the wells to an impounding reservoir near pumphouse. The size of this system will be determined by well conditions but a capacity of at least five hundred gallons per minute will be specified. The system shall be used intermittently to keep impounding reservoir full and at times while either fire or service pump are being used. Power for this system shall consist of an electric motor at one end and a gasoline engine stand by at the other.

Three centrifugal pumps will be installed for fire and service. Two of these will be five inch double suction single stage, capacity seven hundred fifty gallons per minute against one hundred twenty foot head or creating a pressure of fifty two pounds each. To these shall be connected directly by flexible coupling, one to each, a forty horse power two hundred and twenty volt, three phase, slip ring electric motor.

One six inch three stage centrifugal pump of a capacity of seven hundred fifty gallons per minute creating one hundred pounds pressure connected directly to a gasoline engine seventy five horse power and of a type approved by the National Board of Fire Underwriters.

The five inch centrifugals will be arranged in series with connections for parallel use. In series they will be used as fire pumps capable of creating one hundred and four pounds pressure with capacity of seven hundred and fifty gallons per minute. In parallel either or both may be used for service intermittently to pump into both elevated tank and system; singley at the rate of seven hundred fifty gallons per minute against one hundred twenty foot head (the height of the elevated tank), together at the rate of one thousand five hundred gallons per minute against same head.

PUMPING SYSTEM (Cont'd.)

The six inch centrifugal serves merely as a stand by in case of failure of electric power or in cases of extreme conflagaration may be thrown in parallel with five inch pumps to deliver one thousand five hundred gallons per minute.

The cost of these three pumps was compared with that of two pumps, one a five inch with motor at one end, and one a six inch with motor at one end and gasoline engine at the other, these two in parallel only. Equipment for three pumps cost less than the two but installation is estimated to bring the cost of the three pumps a very reasonable quantity above the two. However three pumps can give double fire protection and double service besides a far greater range in their usage.

STORAGE:

Storage shall include a seventy five thousand gallon impounding concrete reservoir at the pumping station and a one hundred thousand gallon elevated steel tank one hundred and ten feet high.

FIRE PROTECTION:

The population being at no place dense a delivery of seven hundred fifty gallons per minute at one hundred pounds pressure is deemed sufficient. The Village is comparatively flat, the heighest elevation above the pumps being twelve feet. This is three thousand feet from the pumps through ten and eight inch pipe giving a total loss of fifty feet making available pressure for fire seventy nine pounds.

COST:

The cost of wells and pumping equipment will vary from a minimum where one well is used to a maximum where three wells are used. The estimated cost of same has therefore been arranged accordingly.

The cost of distributing system has been arranged in the three divisions of the Village; (1) Village (dense) the old section around the mill, (2) Village (sparse) the later addition to the Village south of Kimberly Avenue, and three (3) Sunset Point.

Estimated Costs	
Wells	
Minimum	10,000
Maximum	30,000
Pumping Equipment	
Airlift	
Max. inc. piping	8,000
Min. " "	4,000
Centrifugal Pumps	
Including Motors & Gas.Eng	8,200
Steel Tank	35,000
Reservoir and Pump House	9,300
Distribution System	
(1) Village	40,000
(2) "	103,000
(3) Sunset Point	67,500

SEWERAGE:

There are two systems shown on the plans; (1) to take care of Sunset Point, the Village near the Mill, a small portion of the Village south of Kimberly Avenue between Sidney Street and the railroad track, and the domestic wastes of the Mill; estimated at two hundred and seventy five thousand gallons per day max. 1945 and one hundred and fifty thousand gallons per day max. 1935, (2) to take care of the rest of the Village, estimated at two hundred and seventy five thousand gallons per day max. 1945 and one hundred ten thousand gallons per day max. 1935.

These plans provide sewerage facilities for the areas which are subdivided into lots on the general plan, allowance in size of pipe being made for future growth within the present areas not subdivided in the Village and possible extension of the Village to the eastward and the section south of Kimberly Avenue across from Sunset Point.

The first mentioned system with the exception of that portion south of Kimberly Avenue is the extent of construction contemplated including septic tank and sludge bed. This region also holds for the water supply.

No industrial wastes are to be taken care of.

All of the system will be vitrified glazed tile pipe except a one hundred and fifty foot stretch on Central Avenue near the railroad where main crosses the Valley between Sunset Point and the Old Village. This will consist of fifteen inch cast iron pipe on a trestle.

QUANTITIES

Location	4" House Conn.	8"	10"	15"	18"	24"
System (1)	4,536'	16,232'	2,050'	1,320'	780'	1,047'
System (2)	6,040'	12,880'	1,172'	2,400	1,770'	—

Installation of house connections from main to curb is included in this project. At every dead end a flush manhole as of detailed plan will be installed. In view of the present conditions of the Fox River, septic tank and sludge bed only are included, with provisions for future filter beds and treatment plant. The detention period in the septic tank for 1935 is estimated at five hours; and that for 1945 is estimated at two and one quarter hours.

The soil is mainly stiff red clay of glacial origin with the characteristic bowlders therein. A short distance through the Mill will be through cinders. Approximately one third of the system is under normal ground water level.

COST

System (1)	80,800
System (2)	76,800
Septic Tank	10,500
Sludge Beds	2,500

REMARKS:

All figures on 1930 prices and all references to Village as of 1930.

Town Planning Engineer

COMPLETE SYSTEM (Cont'd.)

Street	Size	Beginning	Direct'n & Dist.	To
Central	8"	At E. pkg strip Sun set Ave and W. pkg strip Central Ave. & X	E along W.pkg strip & E. along E.pkg strip. 2358'	E.Pkg.Strip Edgehill Rd & Y
Kimberly	8"	E. Pkg strip of Beverly. At Elbow	E. 1778' to C	C.L.of E.R. east of G.H. Point.
Clark	8"	E. Pkg strip Kimb. Ave. & Y	E. 638'	E.Pkg strip Sunset,& Y
Overlook	8"	E. Pkg Strip Kimb. Ave. & Y	E 858'	E. Pkg strip Sunset pkg strip Edgehill,& X
Greenfield	8"	E. Pkg. Strip Kimb. Ave. & Y	E 878'	E. Pkg strip Sunset, & Y
Edgehill	8"	E. Pkg Strip Central & X	E 375'.	E. Pkg strip Beverly, at elbow.
Grandview	8"	E. Pkg Strip Sunset & Y	E 640'	E. Pkg.strip Beverly,& Y
Newberry	4"	E.Pkg Strip Central & Y	E 858'	E. Pkg strip Clark Street & Y.
Overlook	4"	E. Pkg Strip Sunset & X. Down C.L.Pkg. strip in C.L.Street to E. Pkg Strip Central thence E. on line dividing lots 11,12, and35, 36, Blk. No 3.	E. 800'	E.Pkg strip Beverly,& Y
Cambridge	4"	E. Pkg Strip Greenfield & Y	E. 441'	E.Pkg strip Edgehill, & Y
Oak Place	4"	E. Pkg. Strip Central & Y	E.E. 870'	E.Pkg strip Beverly, & Y

NOTE: The above description includes ONLY Sunset Point Addition.

NOTE: The following description includes that section of the Present Village which is bounded on the North by the River, on the East by Elm Street, continued]n on the South by Kimberly Avenue and on the West by the Cemetery Street.

Central	10"	C.L.of R.R. between Sunset Pt. and Old Village, & Present.	E. 440'	E. Pkg Strip of Elm St. & Y
Sunset	10"	& Y at Tank Tower 20' West of Power	E. 1800'	E. Pkg strip of Elm Street & Y.

COMPLETE SYSTEM (Cont'd.)

Street	Size	Beginning	Direct'n & Dist.	To
John	10"	N. Pkg. Strip Central, a Y	S. 737'	N. Pkg. Strip Sunset, a X
Elm	10"	N. Pkg. Strip Sunset, a X	S. 845'	N. Pkg. Strip Kimb. a X
Central	8"	E. Pkg Strip John St. a Y	E. 600'	E. Pkg Strip Main St. a Y
Branch to Factory	8"	E. Pkg Strip Main, A Y	[illegible]	A Point at Factory
Sunset	8"	C.L. of R.R. betw. S.E.Pat. and Old Village	E. 225'	[illegible]
James	6"	N. Pkg. Strip Sunset a X	S. 550'	N. Pkg Strip Kimb. Ave. a X
John	8"	N. Pkg. Strip Sunset, a X	S. [illegible]'	N. Pkg. Strip Kimb. Ave. a X
Sidney	8"	N. Pkg Strip Central, a Y	S. 1235'	N. Pkg Strip Kimb. Ave, a X
Elm	8"	N. Pkg. Strip Sunset, a X	N. 330'	N. Pkg. Strip Oak St. a X
Kimb. Ave	8"	C.L. of R.R. betw. S.E.Pat. and Old Village	E. [illegible]'	E. Pkg Strip [illegible] a X
Main	4"	N. Pkg. Strip Central Ave., a Y, along W. Pkg Strip Main St.,	S. 1000'	N. Pkg Strip Kimb. Ave. a Y
Main	4"	N. Pkg. Strip Oak a X	S. 400'	N. Pkg Strip Kimb. Ave. a Y
Oak	4"	E. Pkg. Strip Main, a Y	E. 220'	E. Pkg. Strip Elm, a X

NOTE: The following description includes that portion of the Present Village not included in the above description, but included within the boundaries of the Village of Kimberly as of December, 19[illegible].

Street	Size	Beginning	Direct'n & Dist.	To
Kimberly	10"	E. Pkg Strip Elm a X	E. 1700'	E. Pkg. Strip Wilson Ave. a Y
Main	8"	N. Pkg Strip Kimb Ave. a Y	S. 2000'	200' S. of 3rd Street & Main
Birch	8"	N. Pkg Strip Kimb Ave. a X	S. 1900'	100' S. of 3rd St. & Birch

[illegible] (Cont'd.)

Street	Size	[illegible]	[illegible]	[illegible]
Wilson	6"	E. Pkg Strip Elm Ave., E Y	6 1000'	E. Pkg Strip 2nd St., E Y
Wilson	6"	E. Pkg Strip Elm Ave., E Y	6 1000'	A Pvt. Conn. by Engineer.
John	6"	E. Pkg Strip Elm Ave., E Y	6 1000'	E. Pkg Strip 2nd St., E Y
Sidney	6"	E. Pkg Strip Elm Ave., E Y	6 1000'	E. Pkg Strip 2nd St., E Y
Elm	6"	E. Pkg Strip Elm Ave., E Y	6 1000'	A pnt 100' E. 2nd St. & plug
Maple	6"	E. Pkg Strip Elm Ave E Y	6 1000'	100' E. 3rd St. & plug
[illegible]	6"	E. Pkg Strip Elm Ave., E Y	6 1000'	E. Pkg Strip 3rd St., E Y
Pine	6"	E. Pkg Strip Elm Ave., E Y	6 1000'	E. Pkg Strip 2nd St., E Y
Pine	6"	E. Pkg Strip Oak St., E Y	6 700'	Pt. Conn. by Engineer.
Lee	6"	E. Pkg Strip John St., E Y	6 2400'	E. Pkg Strip Wilson, E Y
2nd	4"	E. Pkg Strip John St., E Y	4 2400'	E. Pkg Strip Wilson, E Y
3rd	4"	E. Pkg Strip Main St., E Y	4 1700'	E. Pkg Strip Wilson, E Y
Oak St.	4"	E. Pkg Strip Pine E Y	4 400'	E. Pkg Strip Wilson, E Y
Along River, [illegible] Pine and Wilson	4"	E. Pkg Strip Pine, E Y	4 400'	E. Pkg Strip Wilson, E Y

PUMPING MAINS.

A twelve inch (12") main beginning at Pumping Station in a southerly direction as designated and laid out by Engineer approximately paralleling the Railroad between [illegible] Point and the Old Village, a distance of approximately 600' to the Tank Tower.

A short twelve inch (12") connection from the Elevated Tank to the main in Sunset Avenue, about forty feet (40').

A short ten inch (10") line from the Pumping Station to the main in Central Avenue.

PUMPING MAINS (Cont'd.)

An eight inch (8") line from the Well to Subsidiary Concrete Reservoir, about [illegible]', and such other lines, eight inch (8"), as may be necessitated by additional Wells.

NOTE: In the foregoing description of Water Mains, where mains cross or abut, they shall be connected with the appropriate castings.

CONNECTIONS IN PUMP HOUSE.

All Piping and Pipe Connections in Pump House shall be flanged pipe of the American Water Works Association, Standard, class "B", and the necessary flanged fittings, as shall be determined by the final pumping installation.

OTHER EQUIPMENT.

Valves, Valve Boxes, Blow-out Specials and any other equipment such as Hydrants, etc., not specifically mentioned shall be installed as noted on the accompanying plans.

ESTIMATED QUANTITIES.

	Sunset Point	Old Village (1)	Old Village (2)
4" Pipe	[illegible]	[illegible]	[illegible]
6" Pipe	[illegible]	[illegible]	10,000'
8" Pipe	[illegible]	[illegible]	7650'
10" "	—	[illegible]	1700'
Hydrants	26	11	35
4" Valves and Boxes.	30	27	24
6" Valves & Boxes	30	20	45
8" Valves & Boxes	11	8	15
10" Valves & Boxes	8	7	2
Blow-outs & Valves	SEE General Water Supply Plan.		

EXCAVATION: The Contractor shall make to the lines and grades given by the Engineer all excavations required for constructing the system of Water Mains including the laying of pipe, specials, etc., and the placing of hydrants, valves and other appurtenances.

In general, the pipe shall be laid so that the top thereof shall be six (6') feet below the surface of the ground.

Trenches shall be excavated of sufficient width to afford ample room for building and inspecting the structures they are to contain, and for shoring purposes and drainage, and also for the removal of any material not deemed suitable for foundations by the Engineer.

All pipe must be laid on a good foundation, trimmed to shape, and where required, secured against settlement in a manner approved by the Engineer. At bells, or wherever found enough additional depth shall be excavated to permit the making of the joints in a proper manner.

Wherever the excavation is carried beyond or below the lines and grades given by the Engineer, the Contractor shall, at his own expense, refill all such excavated space with such material as may be directed, in order to insure stability of various structures.

The Contractor will be required to maintain the sides of the excavation by bracing, or otherwise, but no allowance will be made therefor unless the same is left in the trench by the written order of the Engineer.

The Contractor shall at all times during construction, provide a suitable pumping plant with which to remove and properly dispose of all water promptly from all excavations and keep them dry until the structures to be built are completed.

Wherever the necessities of Public Welfare or Safety require, the Village Board may through an order by the Engineer restrict the length of trench opened in advance of the completed work to 300', and on completion of each 300' of water main, the street surface shall be restored in good condition and all surplus material and rubbish from that section immediately removed.

The material exahvated shall be laid compactly on the side of the trench and kept trimmed up so as to be of as little inconvenience as possible to the travelling public and adjoining tenants. The Contractor shall not obstruct the gutters of any street but shall use all proper measures to provide for free passage of surplus water. (sharpen)

All material excavated shall be disposed of in back filling, making fills, grading around the work, as may be directed to the lines and grades given by the Engineer, or hauled away by the contractor to a place of disposal as directed by the Engineer.

All trenches or excavations around structures shall be back-filled up the the original surface of the ground, or to such grades as shall be directed. The back-filling shall be done as compactly as possible and the material shallbe
tamped puddled thoroughly in such a manner as to prevent after settlement. If required the trenches and excavations shall be flooded with water while the back-filling is being placed. The filling shall be made with the best material available, selected especially for the purpose and free from stones, over three inches (3 ") in diameter.

EXCAVATION (Cont'd.)

Should there be a deficiency of proper material for refilling the trench, the Contractor will be required to furnish sufficient material without any extra payment therefor.

The materials excavated and those used in construction shall be placed so as not to endanger the work, and so that free access may be had at all times to all parts of the work and to driveways in the vicinity. All streets, roads, railroad, and private ways shall be kept open for the usual travel, and the material shall be so handled and placed as not to unnecessarily interfere therewith.

PIPE LAYING:

Proper and suitable tools and appliances for the safe and convenient handling of the pipes and castings shall be used. Great care shall be taken to prevent the pipes coating from being damaged, particularly on the inside of the pipes. All pieces shall be carefully examined for defects and no piece shall be laid when it is known to be defective. If any defective piece should be discovered after having been laid, it shall be removed and replaced with a sound one by the Contractor at his own expense.

Whenever pipe requires cutting, the work shall be done by the Contractor, without further compensation, in a manner satisfactory to the Engineer.

In jointing the pipe and special castings the spigot of each piece shall be properly seated in the bell of the next adjacent piece and adjusted so as to give a uniform space for the joint, which shall be made with twisted or braided hemp packing and soft pig lead. The packing shall be thoroughly driven into the bell, that the lead after having been caulked, shall have a depth of at least two (2) inches. The melting pot shall be kept near the joint to be poured and each joint shall be made at one pouring. Dross shall not be allowed to accumulate in the melting pot.

The joint shall be caulked by competent mechanics and in such a manner as to insure a tight joint without overstraining the iron of the bells.

The price specified to be paid per lineal foot of each size of pipe shall include all costs, of excavating and back filling the trenches, of the furnishing, unloading, storing, hauling, placing and laying of the pipe and specials, furnishing lead gaskets, block or wedges, and shall include the furnishing of all labor, materials, and appurtenances necessary to complete the work as specified.

The measurements upon which payment will be made shall be along the center line of the main from the axis of connecting main to axis of connecting main.

HYDRANTS:

Hydrants shall be placed and connected with water mains by a tee and 4" water pipe at the points indicated on the

HYDRANTS (Cont'd.)

plans and in the manner specified.

Said hydrants shall be located in the Parking Strip on same side of street as water main that supplies them and shall be constructed so as to have a clearance of one (1) foot between them and the nearest edge of curb.

Each hydrant shall be connected with the water main pipe by means of a calked joint on the end of the four (4) inch branch, as hereinbefore mentioned. Each hydrant shall be set vertically on a flat stone eight (8) inches thick so that the top of the inlet shall be six (6) feet below the surface of the ground. Each hydrant shall receive two (2) coats of mineral paint.

The price specified to be paid for each hydrant shall include all costs of necessary excavating and back filling and of furnishing, placing and painting, and shall include the furnishing of all labor, tools, materials, and appurtenances necessary to complete the work as specified.

Pipe connecting hydrants with mains will be paid for at the price specified for four (4) inch water main.

VALVES

There shall be inserted in the water mains valves of same size as mains in which they are located, and these shall be located at points indicated on the plans. Valves shall be connected in the mains with joints equal to those specified for water main joints.

Each valve shall be provided with a cast iron valve box, placed thereon. Valve boxes shall be set vertically on the valves and adjusted so that their tops will be at the elevation of the ground before being disturbed.

The price specified to be paid for each size of valve shall include the cost of furnishing and placing the valve and valve boxes and connecting the valve in the mains, and shall include the cost of all labor, tools, materials, and appurtenances necessary to complete the work as specified.

TESTING

Wherever conditions will, in the opinion of the Engineer, permit, the pipe shall be tested before the trenches are back-filled, by filling the pipe with water under a hydrostatic pressure of one hundred and fifty (150) pounds per square inch, for a period of at least one hour. The Contractor shall, at his own expense, furnish all apparatus and appliances necessary or proper for all tests, except gauges and meters. All joints shall be examined during the open trench test and all visible leaks entirely stopped.

Where, in the opinion of the Engineer, the trench cannot be kept open for testing, the pipe, after backfilling, shall be subjected in the same manner to the above named pressure.

TESTING (Cont'd.)

Whatever leakage exceeds a rate for twenty four (24) hours equal to two hundred (200) gallons per inch of diameter per mile of pipe, the joints shall be dug up and recalked until leakage is within the limit specified.

Any leaks or defects found in the joints shall be promptly repaired, and any cracks and broken pieces of pipe shall be removed and replaced with sound pieces.at the expense of the Contractor, and the line again tested. Taps for the release of air shall be made where required and securely plugged before tests are made.

MATERIALS.

PIPE.

All of said water main pipes shall be of cast iron and shall be of the kind known as the bell and spigot pattern and composed of neutral pig-iron, without cinders, cast in dry sand molds, with flasks placed vertically and shall withstand a hydrostatic pressure of three hundred (300) pounds to the square inch, when struck a series of blows by a three pound hammer while under such pressure.

All pipe shall be straight, and shall be true circles in section, with their inner and outer surfaces concentric at least twelve feet (12') in length exclusive of sockets and shall conform to the American Water Works Association specifications for Standard Class 150 pipe.

Special care shall be taken to have the sockets of the required size. The sockets and spigots shall be turned with circular grooves and the pipe with the spigot which is effective in joint room from any irregularities in the sockets and outside diameters of the spigot ends of the pipe shall not vary from standard dimensions by more than 0.06 of an inch. No pipe shall be accepted the weight of which shall be less than the standard weight by more than five (5%) percent.

Special castings shall conform to the standard sizes and dimensions of the American Waterworks Association specifications.

All pipes and special castings shall be made of cast iron of good quality and of such character as to make the metal of the castings strong, tough, and of even grain, and soft enough to satisfactorily admit of drilling and cutting. The metal shall be mixed without any admixture of cinder iron or other inferior metal, and shall be remelted in a cupola or air furnace.

The pipes and special castings shall be smooth, free from scale, lumps, blisters, sand holes, and defects of every nature, which unfit them for use for which they are intended. No plugging or filling will be allowed.

PIPE (Cont'd.)

Every pipe and special casting after having been thoroughly cleaned, inside and outside, shall be heated to a temperature of three hundred (300) degrees, Fahrenheit, and immersed in a bath of coal tar pitch varnish of an equal temperature. To this material sufficient oil shall have been added to make a smooth coating, tough and tenacious when cold, and with no tendency towards brittleness or scaling off.

HYDRANTS.

Hydrants shall be of a standard type of two nozzle fire hydrant, and the distance between the top of the inlet and the bottom of the base nozzle of said hydrants hereinafter described shall be seven (7) feet. Each hydrant shall withstand a hydrostatic pressure of three hundred (300) pounds to the square inch, and the different parts of said hydrant shall be proportioned for strength and durability under said pressure. Each hydrant shall be provided with a drip that will leave no water standing in the standpipe when the hydrant is closed, and shall close tightly when the hydrant begins to open. The gate or valve shall operate freely and easily and shall be faced with material which will not corrode, injure or stick to the valve seat.

Each hydrant shall have an inlet of five inches (5") in internal diameter, and two hose nozzles, each two and one-half (2½") inches in internal diameter, fitted with a thread of the same standard as that used on the hose of standard fire hydrants. The nozzles shall be of the best quality of brass, one quarter (¼") of an inch thick at the bottom of the threads, and have a width of three-quarters (¾") of an inch thick where screwed to the hydrant. The nozzles shall be securely locked into the hydrants and well packed, and provided with a cast iron cover securely attached by a chain.

VALVES and VALVE BOXES.

Valves shall be of the kind known as the double gate cast iron body, brass mounted heavy pattern, iron and brass valve of a type approved by the Engineer. They shall be constructed of the best material, and shall stand without leaking a hydrostatic pressure of three hundred (300) pounds to the square inch, being applied first on one side of the gate and then on the other. Said valves shall be of the best quality and shall be smooth and perfect, without any imperfections. Each valve shall be provided with a cast iron valve box placed thereon.

Said valve box shall be of cast iron of the extension pattern, having an internal diameter of five (5) inches and provided with a suitable base and a cast-iron cover, with the word " WATER" cast thereon.

VALVES and VALVE BOXES (Cont'd.)

Each valve box shall be of sufficient length to extend from the body of the valve to the surface of the ground and lap six inches (6 "). Each valve box shall receive a coat of coal pitch varnish as herein before provided for the cast iron water mains.

DEEP WELLS

EXTENT OF CONTRACT.

These specifications include the furnishing of all labor and materials except where otherwise specifically stated necessary to sink and construct one or more deep wells hereinafter described.

LOCATION.

At points as designated by the Engineer, and as approximately noted on the accompanying plans shall be sunk such well or wells as may be required.

SIZE OF PIPE

For a depth of approximately fifty (50') feet shall be sunk a sixteen inch (16") O.D. genuine wrought iron drive pipe of a quality approved by the Engineer, to rock. A fifteen inch (15") hole shall be driven through the top limestones to a depth of approximately three hundred (300) feet from the surface of the ground, installing in this hole to the three hundred feet (300 ') depth, three hundred (300) feet of O.D. pipe,-twelve inches (12"), of a weight not less than forty five (45) pounds per foot, and genuine wrought iron drive pipe.

After the twelve (12") inch O.D.pipe has been installed a twelve inch (12") hole shall be drilled from the bottom of said twelve (12") inch pipe to completion, into the water- bearing Potsdam sandstone, to a depth of approximately six hundred (600) feet, installing in this hole to final depth approximately three hundred (300) feet of ten inch (10") O.D. genuine wrought iron drive pipe.

EQUIPMENT.

The Contractor shall furnish all tools, drilling machinery and men necessary for the sinking of the Well and for the setting of the pipe. He shall furnish the necessary steam. Fuel, oil, water and light shall be furnished by the Village of Kimberly. The Contractor shall further furnish all necessary pipe or fittings, in approximate amounts as follows:

1. Approximately 50 feet of Sixteen (16") inch O.D. 3/8th inch thick, butt joint drive pipe.
2. One Sixteen (16) inch O.D. forged steel drive shoe.
3. Approximately three hundred (300) feet of twelve inch (12") O.D., 45 pounds per foot genuine wrought iron line pipe.

4. Approximately three hundred (300) feet of ten inch (10") O.D. gunning wrought iron line pipe.

CONSTRUCTION:

Whenever a joint occurs in the pipe of the well casing, the joint shall be made water tight. All undesirable water bearing strata which may be encountered in the drilling of the well shall be cut off by reaming and filling with cement, in a manner approved by the Engineer.

TRANSPORTATION:

The Contractor shall pay all freight charges on tools, and drilling machinery, and all other equipment.

The Village of Kimberly shall take away or dispose of all cuttings from the well.

TESTS:

An accurate log of the first Test Well shall be kept, good sized samples samples being taken every twenty-five (25') feet all the way down, samples to be placed in a cigar box or canvas bag furnished by the Village of Kimberly and numbered consecutively. As each vein is tapped beyond three hundred (300) feet in depth, or sooner as conditions may warrant, a test shall be run on the well consisting of lowering a six (6) inch pipe into the well to a point near the vein to be tested, and pumping from this six (6) inch pipe by means of a suction valve suspended from the walking beam of the rigging.

Valve, rods, six (6) inch pipe, and other equipment necessary to run test shall be furnished by contractor and he shall install and remove equipment.

STRATA:

From a report by Professor Bagge of Appleton it is believed that the strata which lie below the surface and which may be encountered in sinking the well will be approximately as follows:

Glacial Drift, clay or till	50'
Galena Lime Stone, Trenton	125'
St. Peter Sand Stone	30'
Lower Magnesium Limestone	130'
Potsdam Sandstone, Upper Cambrian	475'

The general thickness and strata as above given are believed to be approximately correct. These conditions are however, liable to variation, and the resulting condition shall be at the risk of the contractor, and said contractor shall not be entitled to any claim for extra compensation for any variation in said strata or in the condition above described, or for additional labor, material,

or appliances which he is obliged to furnish by reason of such variation or for any unforseen difficulties encountered in the prosecution of the work.

BIDDERS:

Bidders should specify:

1. Cost per foot of each sized pipe for drilling hole and casing pipe complete.
2. Approximate cost of reaming and cementing a bad vein
3. Cost of setting up or installing equipment for drilling
4. Cost per hour for testing (installing 8" line, testing, and removing 8" line)

Contractor shall notify the Engineer at least ten days prior to his commencing actual drilling of his intentions to do so.

PUMPING EQUIPMENT.

EXTENT OF CONTRACT:

The specifications shall include the furnishing of One Airlessxsystem, Three Centrifugal Pumps, Three Electric Motors complete with starters and switches, Two Gasoline Engines complete with self starters and other accessories, Cast Iron Sub-bases for all units, and Foundation Bolts, all of which is hereinafter described and specified. Also competent superintendent to direct the installation of same.

AIR-LIFT APPARATUS:

An Air-lift System shall be used to lift the water from the well or wells to the Subsidiary Concrete Reservoir. The head against which this system will have to act will be determined by a test well. In general the requirements of the Air-lift Apparatus will have to be determined upon the completion of the test well.

The Air-lift Compressor shall have a capacity sufficient to deliver seven hundred and fifty (750) gallons of water per minute at the Subsidiary Reservoir.

The compressor shall be driven by an electric motor of sufficient horse-power to guarantee the delivery of the above specified amount of water to the reservoir, and having an efficiency of not less than 90%. Current for this motor shall be A.C. two hundred and twenty (220) volts sixty (60) cycle three (3) phase.

A Stand Up Gasoline Engine shall be installed of sufficient capacity to take the place of the above described electric motor should the electric power fail in an emergency.

The compressor shall be short belt driven

CENTRIFUGAL PUMPS

Two Five (5) Inch Double Suction, Single Stage Centrifugal Pumps, each capable of delivering seven hundred and fifty (750) gallons per minute, at seventeen hundred and fifty (1750) R.P.M., against one hundred and twenty feet (120') head, with an efficiency of not less than sixty (60%) percent, and a brake horse-power of not less than thirty (30) horse-power, shall be installed.

Each Pump shall be driven by a Forty Horse-power two hundred and twenty (220) volt, three (3) phase, sixty cycle (60), slip ring, A.C. Motor, of not less than ninety percent (90%) efficiency, complete with starter and circuit breaker, and a power factor of not less than eighty-five (85).

Each Pump shall be mounted on a cast iron sub-base and direct connected by a flexible coupling to motors.

These units shall be connected both in parallel and in series as shown on the plans. In series they shall have a capacity of at least seven hundred and fifty (750) gallons per minute against two hundred and forty (240) foot head creating a pressure of at least one hundred (100) pounds.

These above centrifugal pumps shall be used in series for fire service and singularly as in parallel for service. As service pumpps they will be used intermittently to fill elevated steel tank and pump directly into the system.

One Six (6) inch three-stage centrifugal pump capable of delivering seven hundred and fifty (750) gallons per minute against one hundred (100) pounds pressure with an efficiency of not less than 60% at one thousand two hundred (1200) R.P.M. With a brake horse-power not less than 45.

This pump shall be driven by a gasoline engine of not less than seventy five (75) horse-power at one thousand two hundred (1200) R.P.M. and of a type approved by the National Board of Fire Underwriters.

This unit shall be mounted on a cast iron sub-base and pump shall be direct connected to gasoline engine.

This unit shall be connected directly to mains and shall be used as a stand by in case the electric power fails for both fire and service usage. It may also be used in cases of extreme conflagration to increase the delivery of the smaller units.

TESTS:

All pumping equipment shall be subjected to a test of the conditionsthey are specified to meet, the test to take place at the factory before shipment.

PUMPING EQUIPMENT (Cont'd. Tests)

In addition a field test shall be made on all equipment under as near the specified conditions as possible. Both tests shall show that equipment fulfills specifications for final acceptance. Contractor shall furnish all equipment necessary to make tests.

GUARANTEE:

All units and equipment shall be guaranteed for not less than one year from date of acceptance; all defects developing within that time shall be replaced free of charge by the contractor. In the event the contractor does not replace defects developing within guarantee within reasonable time after notification, the Village deserves the right to have defects remedied and costs charged to contractor.

FOUNDATIONS:

All concrete foundations shall be built by the contractor building pump house. Foundation bolts for the units shall be furnished by contractor supplying pumping equipment.

It is understood that the layout of foundations as shown on the plans is but approximate and is subject to change upon submittance of plans and specifications of successful bidder.

DELIVERY:

Equipment shall be delivered at the Village of Kimberly, Wisconsin on the Industry Track of The Chicago and Northwestern Ry. leading to the Kimberly-Clark Mills at Kimberly.

ERECTION:

Contractor shall furnish competent superintendent to supervise erection of all equipment.

CONNECTIONS:

Air Lift Pressure equalizer located at pumping station to distribute air to the well. Air will be used to lift water from wells to booster located at mouth of well, booster will lift water to reservoir.

Service To pump from reservoir directly into system or directly into one hundred and ten (110) feet elevated tank or into both.

Fire To pump from reservoir directly into system or system and tank.

All water-pipe connections in pump house shall be flanged pipe and fittings.

BIDDER:

Bidder shall be required to furnish specifications covering special features of pumps and equipment and the following items:

PUMPING EQUIPMENT: (Bidder) Cont'd.

1. Pumps - type - suction - stage - diameter of suction inlet- diameter of discharge outlet
2. Capacity - efficiency - R.P.M. - head or pressure
3. Detailed specifications describing general and particular features of construction of equipment
4. Guarantee - weight of each complete outfit
5. Price - terms

Bidder shall likewise furnish setting diagram showing floor space and position of pipes and connections and footing plans.

STEEL TANK AND TOWER

EXTENT OF CONTRACT:

These specifications include the furnishing of all labor and material, except where otherwise specifically stated, necessary to construct and complete a steel tank and tower complete with foundations, metal roof, balcony, ladder on roof and side of tank, overflow at top of tank, expansion joint in bottom of tank for twelve (12) inch riser pipe, a twelve (12) inch C.I. flanged riser pipe and foot elbow, and three (3) ply wooden frost casing around riser. This shall be installed near Sunset Ave. and ~~Henry~~ James Sts. at place laid out and designated by Engineer. Capacity of tank shall be one hundred thousand (100,000) gallons and height shall be one hundred and ten (110) from feet from top of foundation to top of water when tank is full.

BIDDER:

Bidder shall submit along with estimate of cost (a) general plans of tank including general dimensions and sizes and shapes of members (b) complete specifications for tank and tower with details of construction and special features (c) a plan for laying out foundations and general dimensions of foundations (d) specifications for foundations

Bid shall include costs of unloading and hauling material and painting tank and tower one shop and one field coat of graphite or equally good paint.

Bidder should keep cost of tank and tower and foundations separate.

A statement concerning the following items should also be included: (a) cleaning up (b) tests (c) guarantee

Engineer shall be notified at least ten (10) days prior to beginning of erection.

STORM WATER AND
SANITARY SEWER SYSTEMS

EXTENT OF CONTRACT:

The specifications include the furnishing of all labor and material except where otherwise specifically stated, necessary to construct and complete a Storm Water Sewer System in the Sunset Point Addition to the Village of Kimberly; to construct and complete a Sanitary Sewer System together with a Covered Septic Tank, Sludge Beds; to construct and complete all necessary Man-holes, Flush Manholes, Catch-basins, Trestle, and any other details shown on the plans for said work accompanying these specifications, which plans are hereby made a part hereof.

LOCATION:

The sewers shall be laid in the location and of the sizes platted on the accompanying plans and profiles thereof, together with the details of same which may be attached, such plans and details to be made a part of these specifications.

BIDS:

The Contractor shall for the price bid per lineal foot for the sewer proper, do all work prescribed in these specifications and make the requisite excavations for building the sewers and appertaining structures and connections; do all ditching and diking, pumping, bailing and draining, all sheeting and shoring; shall make all provisions necessary to maintain and protect all buildings, walls, fences, trees, water pipes, conduits, sewers, steam railway, and other structures and shall repair all damage occurring to the same during the progress of the work and shall provide all bridges, fences or other means of maintaining travel on intercepted streets, roads, railroads, alleys and public places and on streets, alleys and roads on which trenches are excavated, after giving due notice to parties affected thereby; shall maintain the same in good condition so long as may be necessary and shall then remove such temporary expedients and restore such ways to their proper condition; shall provide watchmen, fences, red lights and all other precautionary measures for the protection of persons and property; shall provide all centers and forms, shall construct all foundations, all brick, concrete or timber work; shall set in place all iron work and refill all trenches, do all repairing and paving of streets disturbed by this work as herein provided; shall furnish all material and all tools, implements and transportation required to build and put in complete working order the sewer or sewers awarded him, and shall do each and all to the satisfaction of the Engineer in charge; shall timber all railroads; remove all roots, timber and masonry structures or other obstacles whether shown on the plans or not; and no extension or extra work will be allowed for delay or expense occasioned by the above.

The price per lineal foot of sewer shall include all excavations, all temporary supports, such props, scaffolding, etc., that may be necessary to assure a safe prosecution of the work, until the permanent structure is complete; such temporary sup ports must in all cases be removed by the Contractor at his own expense after or currently with the completion of the permanent structure, the price bid also to include all shafts, pumps, hoists and other machinery.

PROTECTION OF STAKES:

The Contractor must protect all stakes and bench marks from disturbances until permission is given to remove them. A width of not less than two (2) feet on each side of the trench where stakes are located must be kept free from obstructions.

The line of all sewers, man-holes, will be located as shown on the plans, and will be staked out by the Engineer.

EARTH EXCAVATION:

Trenches shall be in open cut without tunneling unless written permission is previously obtained from the Engineer or unless otherwise noted on the accompanying plans, and shall begin at such points and be performed in the manner directed by the Engineer, of such width and height as the Engineer shall direct, and shall be excavated in conformity with cross-section to be furnished by him.

For brick or concrete work in firm material the bottom of the trench is to be excavated to the exact shape of the proposed structure.

Surplus material must be removed promptly on order of the Engineer to a distance of two thousand (2,000) feet free of charge. Over two thousand (2,000) feet one cent per yard per hundred feet will be allowed.

The sides of the trench are to be kept practically vertical and sheeting shall be used to support the sides. Said timber shall be removed as the work progresses, unless timber is left in trench by written order of the Engineer. All timber shall be sound and of sufficient strength to withstand side pressure. If necessary the sheeting shall be tongued and grooved or else over lapped and braced.

For pipe sewers the excavation in earth at the bottom is to be made and shaped by suitable tools, so that the pipe shall have a uniform bearing from end to end with depressions cut at the joints for the socket to rest in.

FOUNDATION:

Whenever the ground or bed is sufficiently firm, the masonry or pipes are to be laid directly on the bottom of the excavation, but whenever this shall not be the case and such foundations is not shown on the plan, it shall be built of concrete as the Engineer shall direct.

EXCAVATION:

Excavation at the joints shall be large enough outside of the joints so that they can be perfectly cemented entirely around the circumference of the pipe.

In excavating for man-holes, catch-basins, inlet basins and their appurtenances leave a space of at least one foot clear between the sides of the excavation or timber which may be used to protect it.

EXCAVATION (Cont'd.)

The amount of trench to be opened in advance of the pipe laying shall be determined by the Engineer, but in no case shall it exceed three hundred (300) feet without his written consent; as each one-half block is completed, the street surface shall be restored in good condition and all surplus material and rubbish shall be immediately removed unless otherwise ordered by the Engineer where the trench is not completely filled at one time.

Excavation material should be deposited so as to be of as little obstruction as possible to the traveling public and adjoining property owners and the Contractor shall keep gutters free from dirt for the passage of surface waters along the street.

The Contractor shall provide for all water courses and drains interrupted during the progress of the work, and replace them in as good condition as he found them.

No additional compensation shall be allowed for excavating for man-holes, catch basins, inlet basins of any kind, excepting such excavations shall be in solid rock as hereinafter specified.

The Contractor shall keep the trench free from water during the progress of the work and shall at his own expense provide and operate all machinery or other appliances necessary to keep down the flow of water until the cement is thoroughly set. No pipe or masonry shall be laid in mud or water.

ROCK EXCAVATION:

Whenever the work rock appears in the specifications it shall be interpreted to mean any material geologically in place and of a hardness when first exposed of three or greater in the scales of mineral hardness, which corresponds to the hardness of the transparent variety of calcite. Other materials shall not be classed as rock although it may be more economical to remove them by blasting.

No claim for any amount of money beyond the contract price will be entertained or allowed on account of the character of the ground in which the excavations are made, except for rock cutting as heretofore specified.

Rock excavation shall be kept well in advance of the sewer laying; when the rock is encountered it shall be stripped bare of earth and the Engineer notified that he may measure or cross section the same. Any rock excavated before such measurement is made will not be estimated, allowed or paid for.

The grade marked on the profile may be altered to pass unforeseen obstructions and the Contractor shall notify the Engineer when an obstruction is encountered which may necessitate a change of grade.

The Engineer will not make any measurement or allowance for any less than one (1) cubic yard of rock.

Rock to be blasted shall be carefully covered with chains, brush and timber and all injuries to person or property by reason of blasting shall be borne by the Contractor. The Contractor is warned to take all precautions necessary to protect life and property and shall

ROCK EXCAVATION: (Cont'd.)

give proper warning to all persons who may be in the vicinity of the work before the blast is set off.

On pipe sewers the rock shall be taken out six (6) inches wider and four (4) inches deeper than the bell of the pipe used, and at no point less than two (2) feet wide. All rock excavated shall be kept separate from other material.

PROTECTION OF WATER PIPES:

Any sewer or water pipe, lamp posts, conduits, electric lights or other fixtures, encountered shall be protected from injury and parties having control of them immediately notified in writing and given 24 hours to take care of them. If the Contractor or any of his employees damage such pipes or fixtures, they may be repaired by the parties having control of them, and the cost of such repairs shall be paid for out of the money which may be due the contractor. The Engineer is to certify that the claims are just and correct.

EXISTING SEWERS, DRAINS AND CONNECTIONS:

If existing sewers or private connections have to be taken up or removed, the Contractor must provide and maintain temporary outlets and connections for all private drains and sewers and he must take charge of all sewerage and storm water which will be received from the drains and sewers and discharged the same; and for the purpose he must provide and maintain at his own expense an efficient pumping plant, and be prepared at all times to dispose of the sewerage and water received from the temporary connections until such time as the permanent connections with the new sewer are built and in service. All connections in service upon existing sewers that are in any affected manner by construction of, or reconstruction of, or alteration of the new sewer, must be reconnected by the Contractor, to the new sewer, taking the place of those disturbed. The labor of reconnecting the above shall be borne by the Contractor, but the actual cost of material used therein will be paid for at the stipulated prices for extra work. In making such reconnections care must be taken that no opportunity is afforded for sewerage to come in contact with new work until such new work has become thoroughly set and hardened.

SHEETING AND SHORING:

The Contractor must furnish and put in place at his own expense such shores, braces, sheeting, etc., as may be considered necessary by the Engineer for the safety of the work and of the public, and no sheeting shall be less than two (2) inches thick.

The sheeting and bracing shall be removed as the work progresses, and in such a manner as to prevent the caving in of the sides of the excavation and while being drawn all vacancies left by the plank shall be carefully filled by ramming with special tools or by puddling as the Engineer may direct.

The Engineer may order the sheeting and bracing left when, in his opinion, it is necessaryfor the protection of the work; in such cases only will a charge be allowed for the actual cost of lumber used therein.

PROTECTION OF WORK AND PROPERTY:

The Contractor shall at his own expense shore up and protect and make good as may be necessary all buildings, walls, conduits, walks, railroads, fences or other property injured or liable to be injured during the progress of the work, and the Contractor will be liable for all damages from neglect of such precautions or any other cause connected with the prosecution of the work.

The Contractor will be allowed extra compensation for extra work at the rate fixed in the contract.

Any work ordered by the Engineer in writing at the authorization of the Village Board shall be considered extra work, and the Contractor shall be obliged to preform such extra work at the same rate and in the same manner as that covered in the original plans.

It is understood, however, that no work shall be ordered as extra work, which can be reasonably interpreted as being part of the general system; any lateral branch or any appurtenance shown on the general plan, even though it is not mentioned in the contract may be ordered installed under this extra clause, and if the bidder does not stipulate a special price for any such appurtenance, he shall install it when ordered to do so at the unit price fixed in his contract or proposal.

House connections may be ordered installed under this contract. If the proposal covers a price on house connections, the Contractor shall make them with [illegible] inch sewer pipe in the manner shown on the plans. They shall rise from wye or tee at the main sewer on a slope which will assure all basements proper drainage. The question of depth at the curb shall be left to the Engineer. The Contractor is required to keep an accurate record and length of all house connections and leave a mark on the sidewalk or curb showing the location of the connection. If no walk or curb is in at that point he shall mark the location with an oak stake 2 by 2 by 24 inches long driven flush with the ground.

PROTECTION AGAINST WATER:

The Contractor is to do all pumping and bailing, to build all drains and to do all other necessary work to keep the trench and sewer free from ground water, sewerage or storm water during the progress of the work; and until the cement mortar is sufficiently set to be safe from injury to this cause and in wet trenches he is to keep a channel open on each side of the work during construction which is to be so constructed as to leave to a pump or a bail hole ahead of the work.

UNDER DRAINAGE:

When ever deemed necessary by the Engineer by reason of springs or other causes the ditches must be drained by use of ordinary tile drain laid in the trenches at the sides of the pipe, the laying of the pipe progressing with the laying of the sewer.

The tiles must be laid on a true grade a little to one side of the sewer pipe, and their joints must be securely wrapped with muslin or burlap torn in strips at least three (3) inches wide and as long as twice the outer circumference of the tile, the middle of the strip must be laid under the tile and first one end and then the other wrapped securely around the joint.

UNDER DRAINAGE: (Cont'd.)

when laid care must be taken that they are not disturbed in back filling the trench. Whenever necessary to secure the proper construction of the sewer because of the amount of water in the trench, tile must be laid by the Contractor in advance of the sewer pipe and on a lower grade. In such cases care must be taken to cover the earth with board to prevent the tile from being disturbed by the workman.

When under drainage requires the installation of tile as specified above, the material shall be paid for on the basis of extra work. Nothing shall, however, be allowed for the labor of laying tile, the materials only being included as extras; it being conceded that the installation of under drainage facilitates the progress of the work and is of as much benefit to the Contractor as to the Village of Kimberly.

BARRIERS:

The Contractor shall erect suitable barriers around the excavation to prevent accident to the traveling public and must provide temporary walks or bridges for foot or teaming traffic, and shall place red lights on or near the work.

REPAIRING AND RESTORING STREETS: DEFICIENCY OF MATERIALS

Should there be a deficiency of proper material for refilling the trench the Contractor shall supply the same without charge.

Paving or crossings of any kind shall be replaced by the Contractor in as good order as when found by him. In replacing paving new material shall be used if the old materials are destroyed or broken, placed in the same manner as the former work. This and all other work of restoring the street shall be done to the satisfaction of the Engineer. When new paving material is required it shall be furnished by the Contractor at his own expense and must be of a quality approved by the Engineer.

DEFECTS:

The Contractor shallk have charge of and be responsible for the entire line of work for the construction of which he has contracted until the completion and acceptance of the work. He shall be liable for any defects which may appear in the work before the final payment specified herein has been made. The fact that any wokk on material has passed previous inspection, estimate or statement made thereon, shall have no bearing on the final inspection of the work. The end of all sewers, pipes and junctions, when left for any temporary purpose must be securely closed with brick masonry.

PIPE SEWERS:

All provisions of the previous sections shall so far as applicable be included in and applied to sewers constructed of pipe.

All pipe sewers and appurtenances shall be constructed of first quality hard burned sewer pipe in two (2) or two and one half (2 1/2) or three (3) foot lengths with deep socket joints, with smooth salt glazed exterior and entering surface, and without blisters, cracks, checks or other imperfections which in the opinion of the Engineer renders them unfit for use.

PIPE SEWERS: (Cont'd.)

All sewer pipes twenty four (24) inches in diameter or larger shall be constructed of first quality hard burned, double strength Vitrified sewer pipe, free from all imperfections; any imperfections impairing the strength or durability of the pipe will be ample for the rejection and condemnation thereof.

All pipes and specials are to be of the bell spigot type and of true form, circular in the base and of exact specified internal diameter and of uniform thickness. Any pipes found to be imperfect when delivered at the ditch will be rejected, although they have passed a previous inspection.

All pipes shall be subjected to such tests as the Engineer shall direct to determine their fitness for the job.

All pipes before being lowered into the ditch must be sounded and matched for cracked and otherwise subjected to inspection. They must be carefully matched so that when jointed in the ditch they will form a smooth line of sewer.

ENGINEER'S GRADE STAKES:

The Contractor shall be responsible for all grade stakes which have been set, and should any line of stakes have to be reset he shall be charged up with the cost of such work at the rate fixed by the Engineer.

REQUIREMENTS FOR JOINTS:

A gasket of oakum may be required and shall be pressed into the joint around the entire circumference of the pipe, and the cement shall be protected by a strip of muslin, in a manner prescribed by the Engineer. No extra compensation will be allowed the Contractor for gasket. No joint shall be cemented until the spigot of the next pipe in advance has been set in place.

CLEANING AND POINTING JOINTS:

A sand bag or other appliance approved by the Engineer for cleaning out cement in the pipes shall be used and advanced as each joint is made; in large pipe inside joint shall be pointed on lower half with trowel.

CEMENTING JOINT:

The cement mortar shall be pressed into the angular space between the socket and spigot so as to completely fill the space. The bevel joint at the end of the bell shall be smoothly and evenly made and shall extend entirely around the outer circumference of the pipe, and special care must be taken to make tight joints. The Contractor is warned to completely fill the angular space around the entire circumference of the pipe with cement or other compound specified. If any joints are found not properly cemented which will allow the seepage of ground water into the sewers, the Engineer shall order the line of pipe taken up and relaid.

CEMENT:

Cement joints shall be made of Portland Cement.

MORTAR MIXTURE:

The morter for brick work is to be made by carefully measuring and thoroughly mixing one (1) part of Portland Cement and three (3) parts of clean dry sand mixing with water to proper consistency and shall be used while fresh, the use of retempered mortar being prohibited. The mortar used in laying sewer pipe shall be a mixture of one (1) part cement and one (1) part sand as specified above. All this to be furnished by the Contractor without extra charge.

CONCRETE:

Unless otherwise specified class "A" concrete is to be used for steel reinforced and water tight structure; class "B" for manhole, inlets, pavements and other structures of intermediate grade; class "C" for massive structures and in general where a higher class of concrete is not specified.

The following is the classification for concrete:

Class	Size of course Aggregate	Proportion in Mixture	Min. cement per cu.yd.
A	1 1/4"	1-2-4	1.48 bbl.
B	2"	1-2½-5	1.30 "
C	2½"	1-3-6	1.00 "

BRICK:

All brick is to be of the best quality of sewer brick uniform in quality sound and hard burned free from lime and cracks with a clear ringing sound when struck and of standard dimensions and compact texture. The bricks when thoroughly dried and immersed in water for twenty four hours shall not absorb more than fifteen percent in weight of water. If in any load of bricks more than ten percent are inferior the whole load shall be rejected. If less than ten percent are inferior the load may be accepted provided the Contractor will pull out the defective bricks at his own expense.

TIMBER:

Timber sheeting and the rangers and braces for the same shall be of a satisfactory quality of timber. Sheeting shall be driven in such a manner as to avoid cracking and splitting.

Timber for trestle work shall be of rough material of sufficient strength and soundness to support pipe. Bents may be of rough logs and bracings of cut timber sizes as shown on detail on profile plan.

C.I. PIPE:

Cast iron pipe on trestle shall conform to standard specifications of class "B" pipe American Water Works Association bell and spigot.

"Y" BRANCHES FOR PIPES:

"Y" branches shall be inserted at intervals along the line of sewers as shown on the plans and as directed by the Engineer. These "Y" branches shall be furnished and laid by the Contractor without extra expense. All "Y" branches when not immediately used are to be provided with earthenware lids and cemented in place. Before cementing the lid in place a rim of clay or sand shall be inserted in the bell of the "Y" so that the lid may be broken out without danger of breaking the "Y". The location of the "Ys" may be varied by the Engineer. The Contractor shall be responsible for a complete record of the exact location of all "Y" branches. He shall mark the location of all "Ys" as hereinafter provided and shall not back fill any trench until the Engineer has taken a record of the location.

"Y" branches shall extend to a point one (1) foot beyond the curb and shall terminate near the middle of each rock where no house is at present built or being built. (See detailed plans.) Otherwise the "Y" branch shall be installed as directed by the Engineer. A stake two inches thick coming to the top of the ground shall be left at each "Y" or the location marked on cement walks or curb.

CLEAN PIPES, PUMPING BAILING:

All pipes must be kept clean and small ditches pumping and bailing must be employed.

PLUGS:

On leaving the trench for the night or any other cause the end of the pipe shall be closed with a water tight plug furnished by the Contractor.

BACK FILLING:

In filling in the earth shall be kept at the same height on both sides of the pipe; in throwing earth from the top of the trench great care should be taken not to disturb the pipe until a covering of two feet has been made over the pipe and well tamped. This two (2) foot covering shall be of clean earth, sand, or rock dust free from stone over one half (1/2) inch in largest dimension. All filling must be thoroughly compacted by tamping or flushing as directed by the Engineer. Enough material must be heaped on the top of the trench to allow for settlement and the Contractor shall keep trench level until completion of work. The Contractor shall keep the roadway passible at intersections and shall provide a proper driveway at the side of the street.

MANHOLES:

A manhole is to be built wherever shown on the plans or as directed by the Engineer and generally at every junction of pipe sewers. Each manhole is to have the form and dimensions shown on the drawing, to be accurately located and finished to street grade or to the elevation set by Engineer. The foundation is to be made by shaping the bottom of the excavation, unless the Engineer orders a special foundation prepared, in which case the additional concrete, brick or timber will be paid for at contract unit prices which include the cost of necessary excavation. The walls are to be eight (8) inches thick of brick masonry plastered outside or

MANHOLES: (Cont'd.)

of class "B" 1-2½-5 concrete all molded at one operation and plastered inside with mortar, if on pipe sewers. The bottom is to be of brick or concrete no part of which is less than six (6) inches thick.

Flush manholes as shown on detail plan if constructed of brick shall be made water tight to the height specified by plastering inside surface to said height with a mixture of mortar consisting of one (1) part cement to one (1) part sand. If constructed of concrete the mix for the concrete shall be that for class "A" as hereinbefore specified.

MANHOLES: (Cont'd.)

Steps of 5/8th inch galavanized iron with 8 inch tread are to be sent in the walls of all manholes at intervals of 12 inches, extending from top to bootom. A cast iron ring and cover of the standard design shown by the drawings, is to be furnished with its weight plainly marked thereon by the manufacturer, and carefully set at proposed grade on a full bed of mortar. Where designated by the plans or by the Engineer, in any manhole, inverts are to be made ready for the future extension of lateral sewers, including for each invert a piece of pipe built as usual through the wall and sealed as specified for house connections; no additional price is to be paid for this work. Each manhole is to be built as soon as practicable after it is reached in the sewer construction, but the masonry work shall not be commenced until the excavation is approved by the Engineer. When shown by the plans, or directed by the Engineer, a drop connection is to be built, its diameter that of the tributary sewer.

The manner of constructing manholes is outlined on the accompanying detailed drawings together with special connections.

COVERS:

Iron castings for covers, or for any use, shall be of good quality, tough, gray metal, free from cracks or flaws, that in the opinion of the Engineer render them unfit for use. All castings for manhole covers, catch basin covers, drain inlets, and any other similar castings shall be of the size and shape shown on the accompanying detailed plans and samples of same shall be submitted to the Engineer for his approval after which they will become a part of these specifications.

CONCRETE WORK:

All cement concrete work shall comply with the specifications as outlined for the CONCRETE SUBSIDIARY RESERVOIR, as to quality of cement its storage, delivery, and tests; the fine and coarse aggregate, the method of mixing and placing the concrete, the placing of forms and the top finish of the concrete together with its protection and water proofing shall also comply with the above mentioned specifications.

GENERAL PROVISIONS:

Measurement of Sewers; the length of a sewer shall be measured on a center line of the completed sewer, measurements being taken from the center of one manhole to the center of the next.

The Contractor shall start work at such point along the line of sewer as the Engineer may direct from time to time and shall progress from the outlet or towards the outlet at the option of the Engineer.

The Contractor upon being by directed by the Engineer shall remove, or rebuild, or make good at his own expense any work that may be deficiently executed.

No work shall be covered until it has been examined by the Engineer or his authorized assistant.

GENERAL PROVISIONS: (Cont'd.)

Upon suspension of any work, the trenches shall be filled and the streets left clean, free and ready for travel. Should the work be suspended for any definite or indefinite time, due to weather conditions or for any other reason, the Contractor shall see that proper travel may be maintained during this time. He shall also see that any wash outs or any damage to the streets caused through the work having been performed be properly prepaired.

The Contractor on completion of the pipe laying shall thoroughly clean and test all lines to the satisfaction of the Engineer; all cleaning and testing shall be done at the Contractor's expense, and shall be considered as a part of the price bid for construction of sewer. No line of sewer will be acceptable unless a light placed in a manhole can be plainly seen in the next manhole showing the openings to be regular sections. Where not built on a straight line, and so built by order of the Engineer, the line will be tested by having wooden balls passed through to see that the sewer is clean and develops the proper velocity.

INSPECTION:

Vitrified pipe must be inspected at the cars, or at any time after delivery as required and the same must be headed up and properly placed for examination by the inspector. Certificate of the test of all cement is to be furnished and approved before the cement is delivered on the works. Other materials are to be inspected as brought upon the work, unless otherwise required. The pipe laying, cementing of joints, the first 18 inches of back filling, the construction of manholes etc., shall be done in the presence of the Engineer or his authorized assistants; otherwise, the Engineer has the right to have this work uncovered at the Contractor's expense, and relaid or reconstructed.

FINAL INSPECTION:

During construction, due care shall be taken to thoroughly clean every sewer, manhole, inlet, or other accessory and to prevent any earth, sand, brick, concrete or other foreign substance from entering, obstructingor remaining in any part of the work. As the work approaches completion and before the final estimate the Contractor shall systematically go over the entire work and prepare it for inspection. All sewers large enough are to be cleaned by hand, shall have all lumps cement, protruding gasket, rubbish and improper objects removed and the sewer flushed, and left with wholly clean and smooth surface. After removing from the manholes all waste, rubbish and improper objects, each pipe sewer so small that it cannot be entered and cleaned by hand, is to be tested by flushing through it a wooden ball, its diameter only two inches smaller than that of the sewer, impelled by a stream of water from the water main, and of such volume as the Engineer shall direct; this water is to be furnished by the Village of Kimberly; all moving objects are to be taken out at the first manhole; all repairs shown by the test to be necessary are to be made, broken or cracked pipe replaced, all deposits removed, the sewer left properly aligned as herein specified and entirely cleaned, free and ready for use. Each section of sewer is to show from either end, on examination, a full circle of lights. There should be no appreciable leakage of ground water into the sewer, nor any leakage carrying mud, sand or other material to be

SHINGLES:

Shingles for roofs, where marked to be best quality Extra Star A cedar shingles, five cut to two, laid 4½" to the weather properly lapped and nailed with iron cut nails.

OUTSIDE FINISH:

Outside finish including cornices, and entrance and window trim, to be made of second clear pine, molded according to details.

SIDING:

Siding to be 8" wide pine, tapered, stock siding, laid 4½" to the weather.

WINDOW FRAMES: ETC.

Window frames to be stock pattern with units as follows; Stiles 7/8" thick, blind stops 3/4" by 1-3/8", parting strips 1/2" by 3/4" sash stops 3/8" by 1-3/8", sills 1-3/8" thick laid with bevel, and ravetted on top and bottom; outside casing 7/8" by 4" plain, Muntins 1/4" between glass. Door frames to be 1-3/8" thick ravetted, and with same outside casings as at windows.

Ventilators to be made of 7/8" by 5-3/4" dressed boards set stationary at an angle of 45 degrees. Boards to be placed 4" on centers. Frames for ventilators 1-3/4" thick. Stiles between same 4" wide.

Doors at entrance 1-3/4", thick, solid pine stock, and sash doors of design as shown.

Do all Carpenter work of every description including all necessary cutting and jobbing for other Contractors. Clean out and remove from premises all rubbish and refuse material.

Hardware and Trimmings to be furnished and put on by this Contractor. Carpenter must furnish all nails, screws, sash weights, cords, pulleys, exclusive of above mentioned trimmings, and including all window glass.

SHEET METAL WORK:

All tin shall be best grade extra heavy coated. Paintall tin and G.I. work on both sides before laying or installing in place. Gutters to be #24 finely crimped G.I. formed as shown and hung to roof. Flashing at intersection of roof and walls, at chimneys and over all openings shall be tin. Conductors shall be 4" round standard, corrugated G.I. connected to sewer.

SLUDGE BEDS

EXTENT OF CONTRACT:

These specifications include the furnishing of all labor and material except where otherwise specifically stated necessary to construct and complete the sludge beds to forms and dimensions shown on the plans and sections , which plans are hereby made a part hereof. This work shall

EXTENT OF CONTRACT: SLUDGE BEDS: (Cont'd.)

include (a) the furnishing of all labor tools and materials necessary to excavate and properly prepare the river bank for the dry walls and beds and disposing of excess excavated material in accordance with the plans and specifications; (b) the furnishing of all labor and material necessary to construct the dry walls as hereinafter specified; (c) the furnishing and placing of suitable materials for the bed proper; (d) the furnishing and placing of wooden distributing troughs as shown on the plans; (e) the furnishing and placing of necessary connections of pipe from septic tank to troughs, as shown on the plans.

EXCAVATION:

The excavation shall be carried to the grades indicated on the plans. All material excavated shall be hauled and deposited at such points as may be designated bb the Engineer at the price named in the proposal.

DRY WALL:

The dry walls shall be constructed of native rock and in such a manner as to insure stability and firmness.

FILLING MATERIAL FOR BED:

Filling material for bed shall consist of coarse particles from one (1) inch up to three (3) inch in largest dimension. This shall be placed on top of the excavation for a depth of at least two (2) feet. On top of this a layer of finer material ranging from one (1) inch down to coarse sand shall be placed for a thickness of eight (8) to twelve (12) inches.

Material may consist of broken stone gravel broken up building material or any such material as may be approved by the Engineer.

TROUGHS:

Wooden troughs of sizes and dimensions as shown on the plan shall be installed. These shall be of rough pine wood firmly nailed together.

CONNECTIONS:

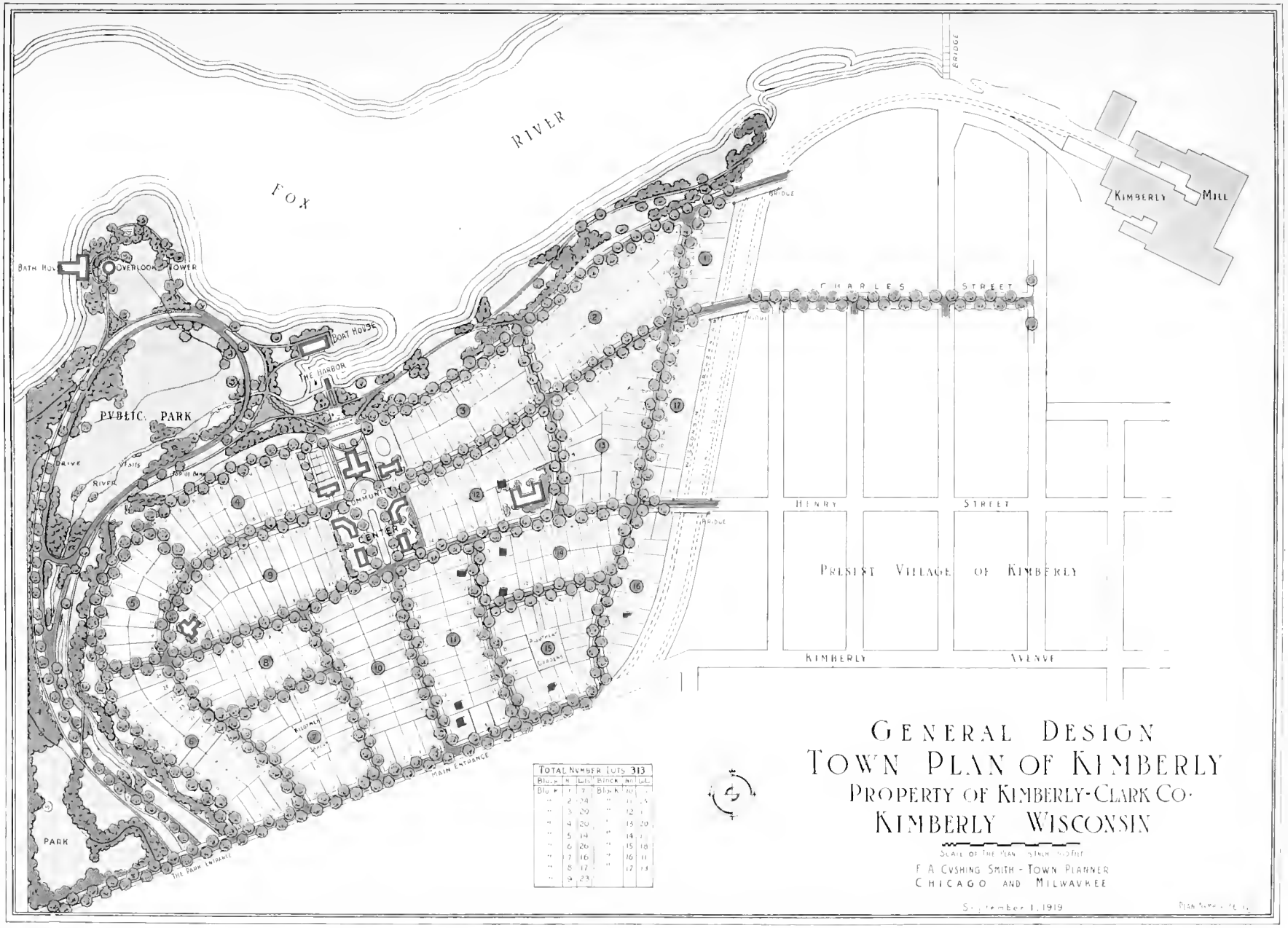
The necessary appurtenances to guide the sludge from the pipe from septic tank to troughs shall be installed as shown on the plans.

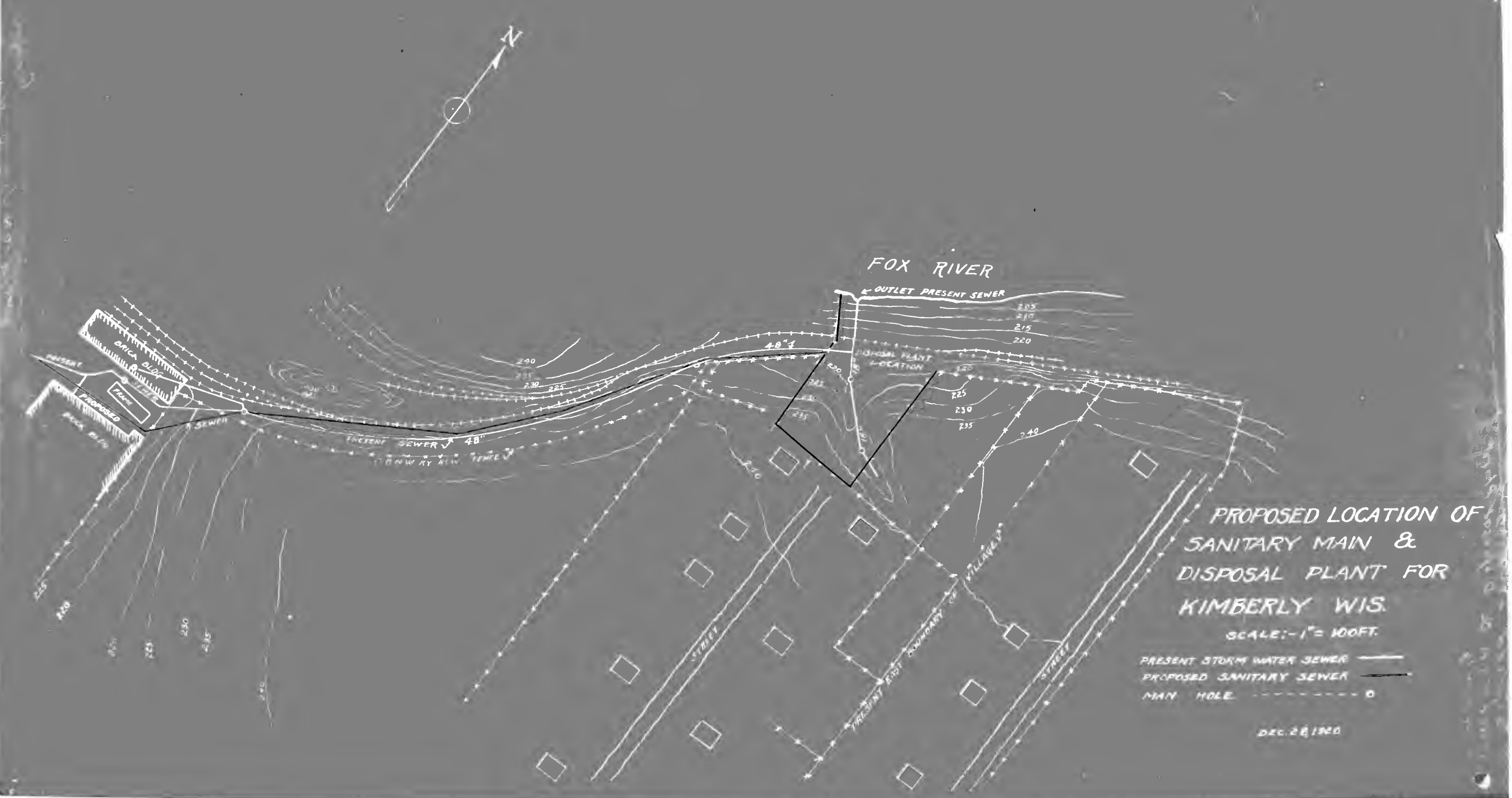
PRICE:

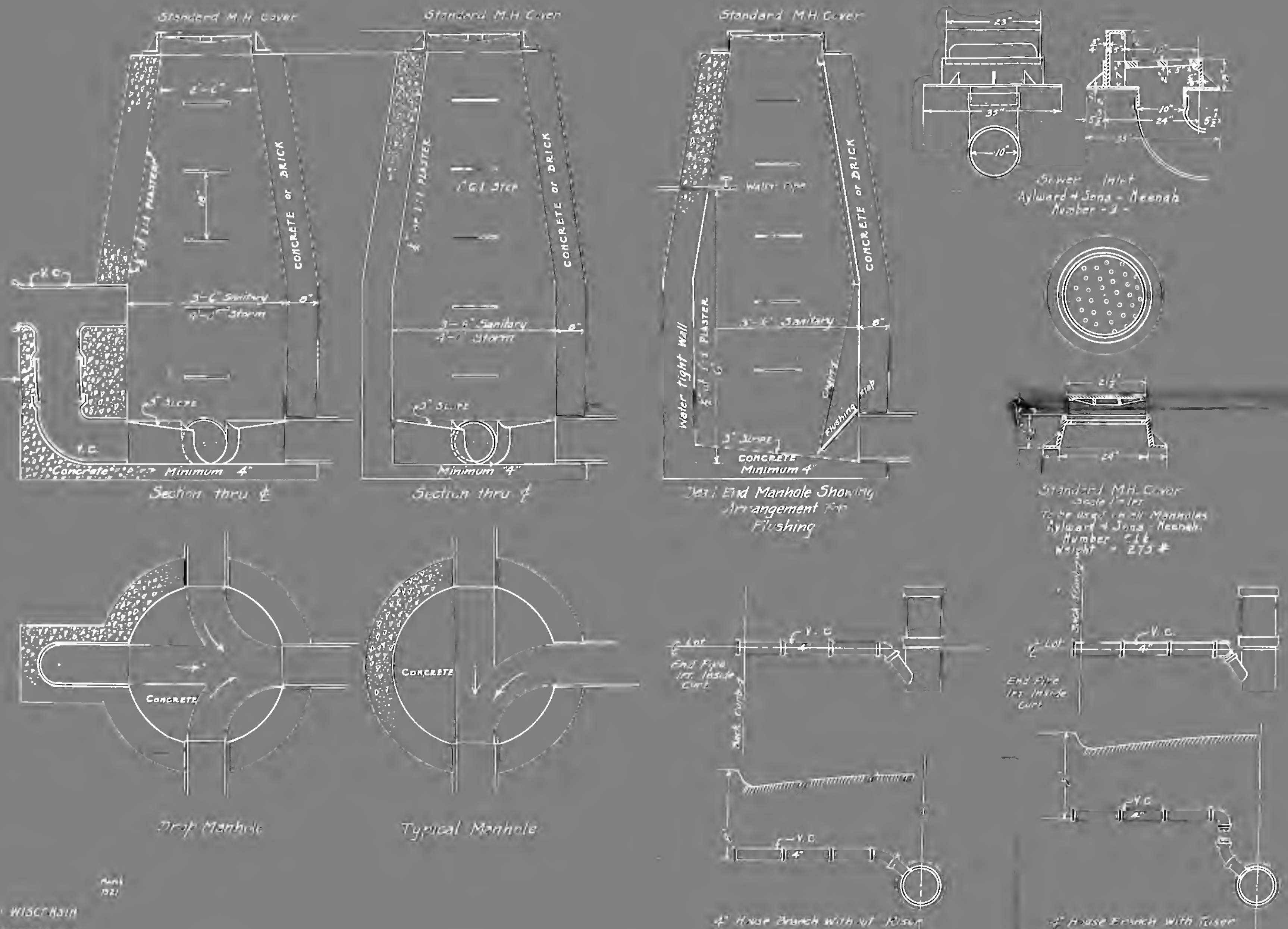
It is intended that the lump sum bid shall cover the entire cost of the completed beds except for the item of hauling and depositing materials.

COMPLETION OF WORK:

All work shall be left in a neat, clean and orderly condition.


FOX
RIVER
BRIDGE
KIMBERLY
MILL
BATH HOUSE
OVERLOOK TOWER
BOAT HOUSE
THE HARBOR
PUBLIC PARK
DRIVE
RIVER
COMMUNITY
CENTER
CHARLES STREET
HENRY STREET
PRESENT VILLAGE OF KIMBERLY
KIMBERLY AVENUE
PARK
THE PARK ENTRANCE
MAIN ENTRANCE
TOTAL NUMBER LOTS 313
Block No. Lots
Block No. Lots
2 24
3 20
4 20
5 14
6 26
7 16
8 17
9 23
10 15
11 14
12 1
13 20
14 1
15 18
16 11
17 13
GENERAL DESIGN
TOWN PLAN OF KIMBERLY
PROPERTY OF KIMBERLY-CLARK CO.
KIMBERLY WISCONSIN
SCALE OF THE PLAN 1 INCH = 100 FEET
F. A. CUSHING SMITH - TOWN PLANNER
CHICAGO AND MILWAUKEE
September 1, 1919


N
FOX RIVER
OUTLET PRESENT SEWER
DISPOSAL PLANT LOCATION
PRESENT SEWER 48"
STREET
STREET
PRESENT EAST BOUNDARY OF VILLAGE
PROPOSED LOCATION OF SANITARY MAIN & DISPOSAL PLANT FOR KIMBERLY WIS.
SCALE:- 1" = 100 FT.
PRESENT STORM WATER SEWER
PROPOSED SANITARY SEWER
MAN HOLE
DEC. 28, 1920

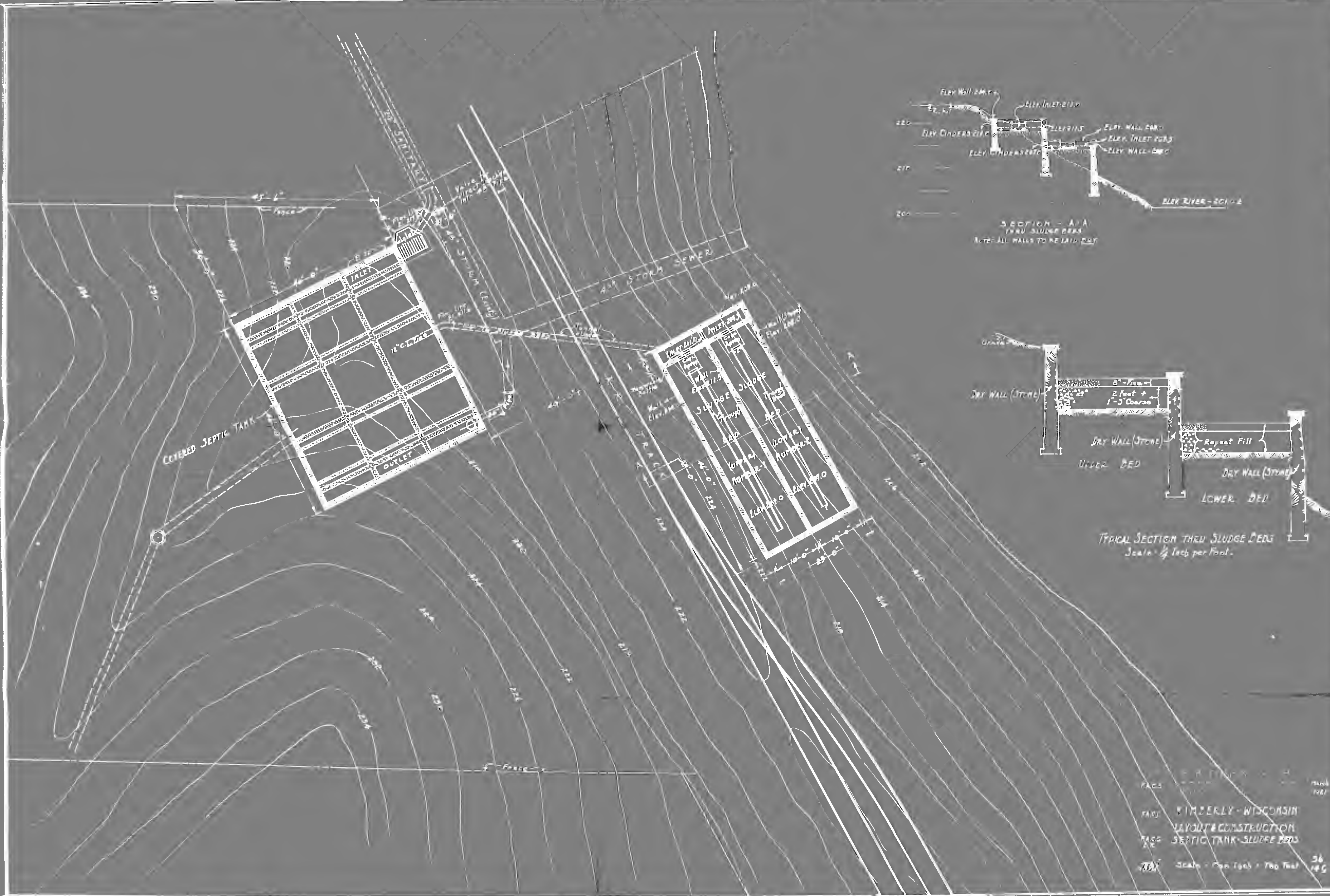


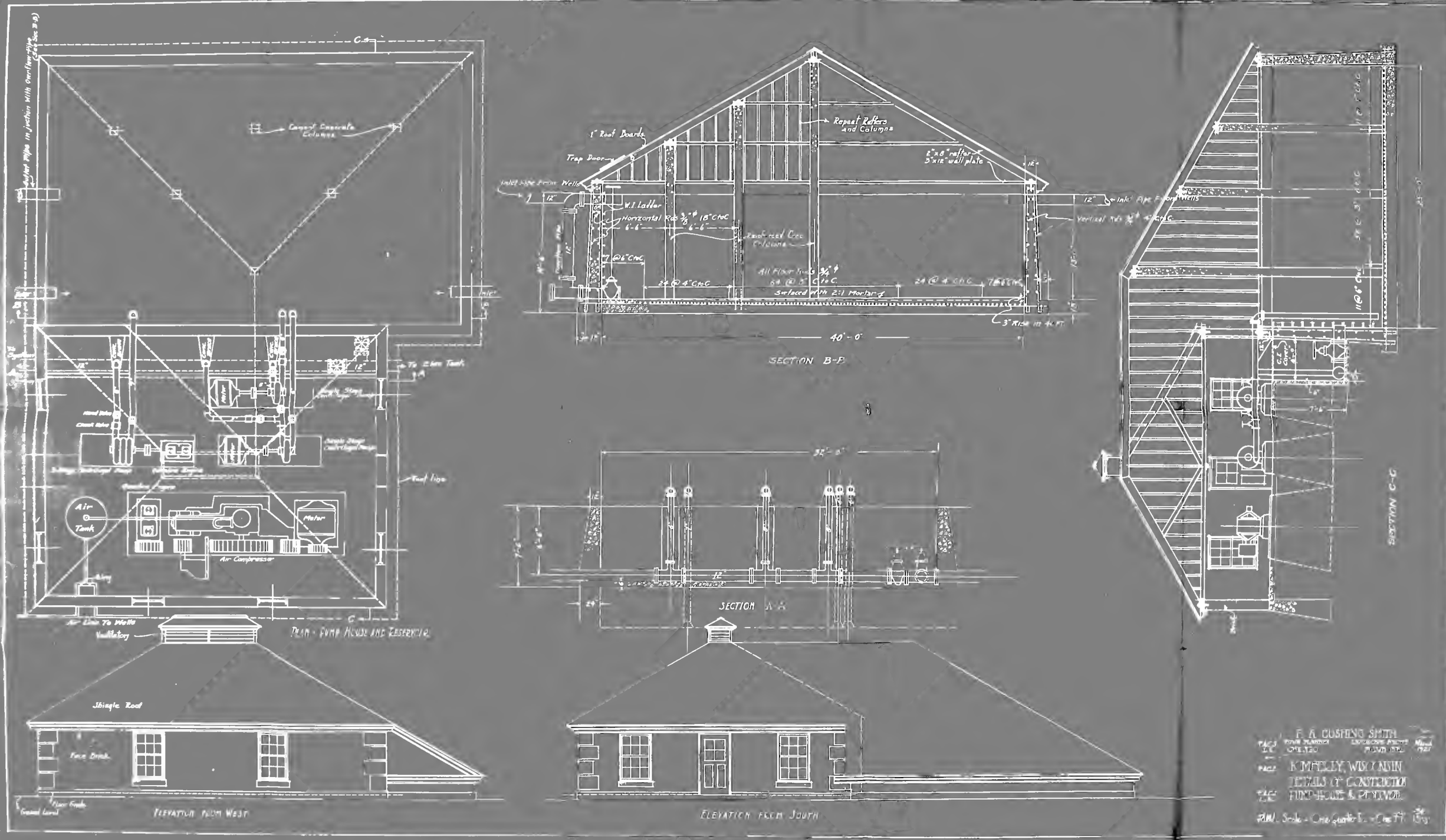
KIMBERLY - WISCONSIN

DETAILS OF CONSTRUCTION
STORM AND SANITARY SEWERS

SCALE - ¾ INCH EQUALS 1 FOOT

1921


12" SANITARY
45" STORM (Exist)
45" STORM SEWER
Fence
45'-6"
INLET
OUTLET
12" C.I. Pipe
COVERED SEPTIC TANK
TRACK
SLUDGE BED (UPPER) NUMBER-1
SLUDGE BED (LOWER) NUMBER-2
10'-0"
25'-0"
SECTION - A-A
THRU SLUDGE BEDS
NOTE: ALL WALLS TO BE LAID DRY
DRY WALL (STONE)
6" - Fine
2 Feet + 1"-3" Coarse
Repeat Fill
UPPER BED
LOWER BED
TYPICAL SECTION THRU SLUDGE BEDS
Scale - 1/2 Inch per Foot.
KIMBERLY - WISCONSIN
LAYOUT & CONSTRUCTION
SEPTIC TANK - SLUDGE BEDS
Scale - One Inch = Ten Feet


Concrete Columns
Air Tank
Motor
Air Compressor
Roof Slope
Jshingle Roof
Face Brick
Repeat Rafters And Columns
1" Roof Boards
Trap Door
W.I. Ladder
Horizontal Rds 3/8" ϕ 18" C to C
Reinforced Conc Columns
All Floor Irons 3/4" ϕ 6ft @ 3" C to C
Surfaced With 2:1 Mortar
3" Rise in 4ft
40'-0"
SECTION B-B
32'-0"
SECTION A-A
SECTION C-C
PLAN - PUMP HOUSE AND RESERVOIR
ELEVATION FROM WEST
ELEVATION FROM SOUTH
F. A. CUSHING SMITH
KIMBERLY, WISCONSIN
DETAILS OF CONSTRUCTION
PUMP-HOUSE & RESERVOIR

VILLAGE OF KIMBERLY

WISCONSIN

GENERAL PLAN

SHOWING STREET ARRANGEMENT
EXISTING & PROPOSED RESIDENCES
KIMBERLY-CLARK PAPER MILLS
OTHER BUILDINGS & STRUCTURES
SUNSET-POINT ADDITION
& PROPOSED SUNSET-PARK

F. A. CUSHING SMITH - TOWN PLANNER
CHICAGO

1920

SCALE

LEGEND

- EXISTING HOUSES & APARTMENTS
- OFFICES & BUILDINGS OF K-C. CO.
- SCHOOLS, CHURCHES, STORES, PARK BLDG.
- MONUMENTS MARKING BOUNDARIES
- CONTOUR LINES MARKING PLATEAU
- BOUNDARY LINES & SECTION LINES
- EXISTING & PROPOSED PARK TREES
- DRAINAGE AREAS FOR STORM SEWERS
- CONTOURS

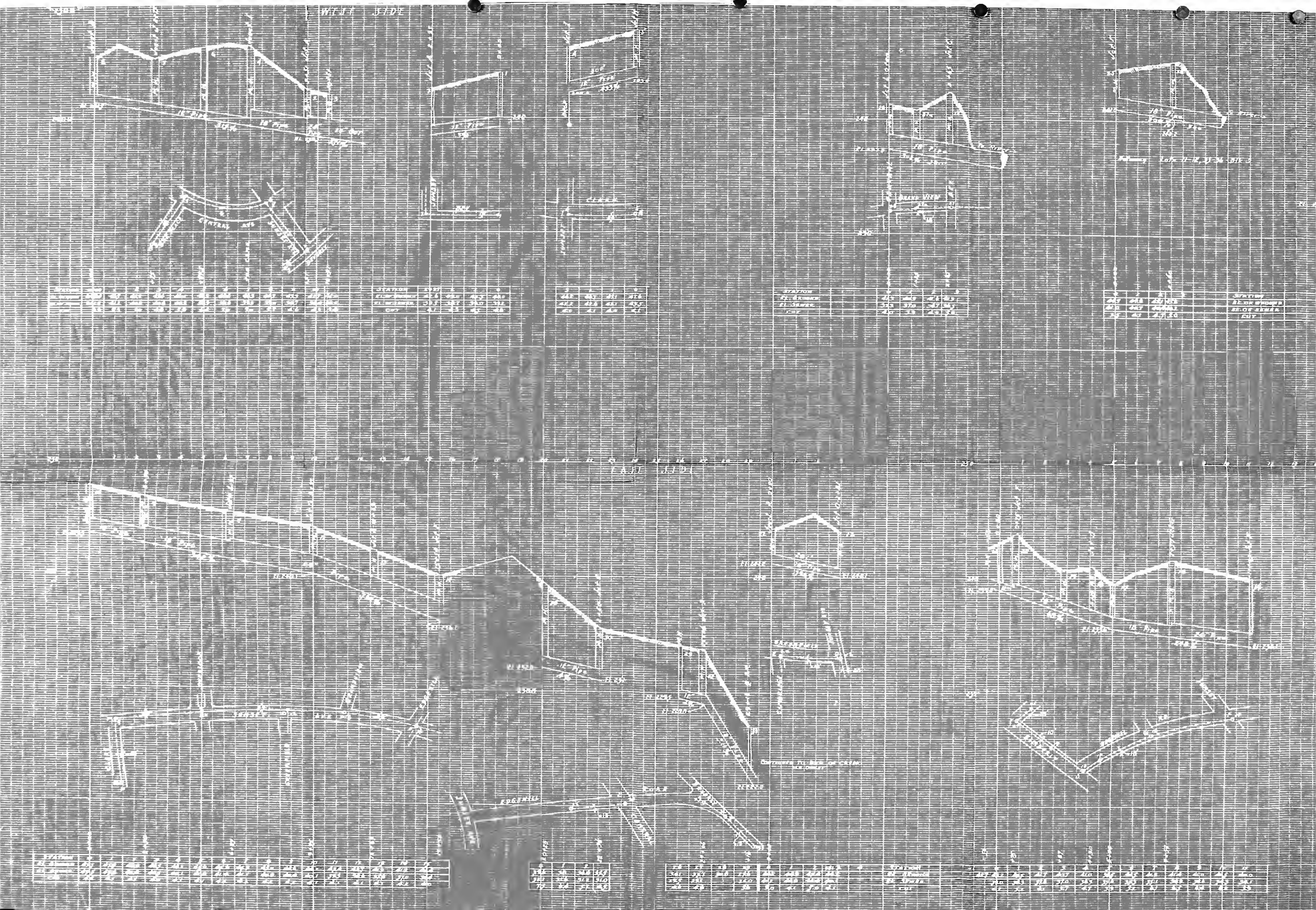
CONTOUR MAP

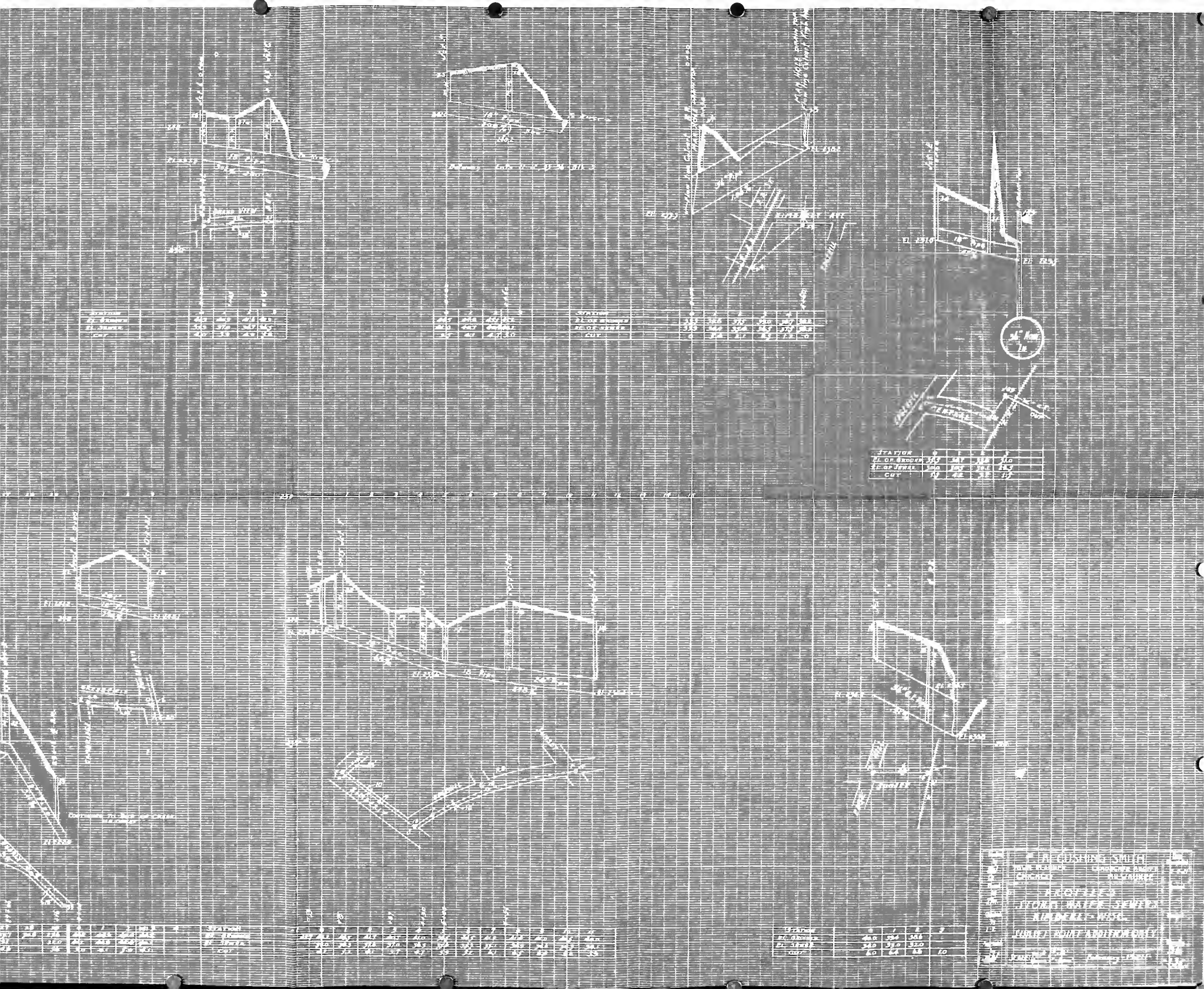

FOX
RIVER
KIMBERLY CLARK COMPANY
HOTEL
OAK
CENTRAL
AVENUE
SUNSET
KIMBERLY
AVENUE
ADDITION

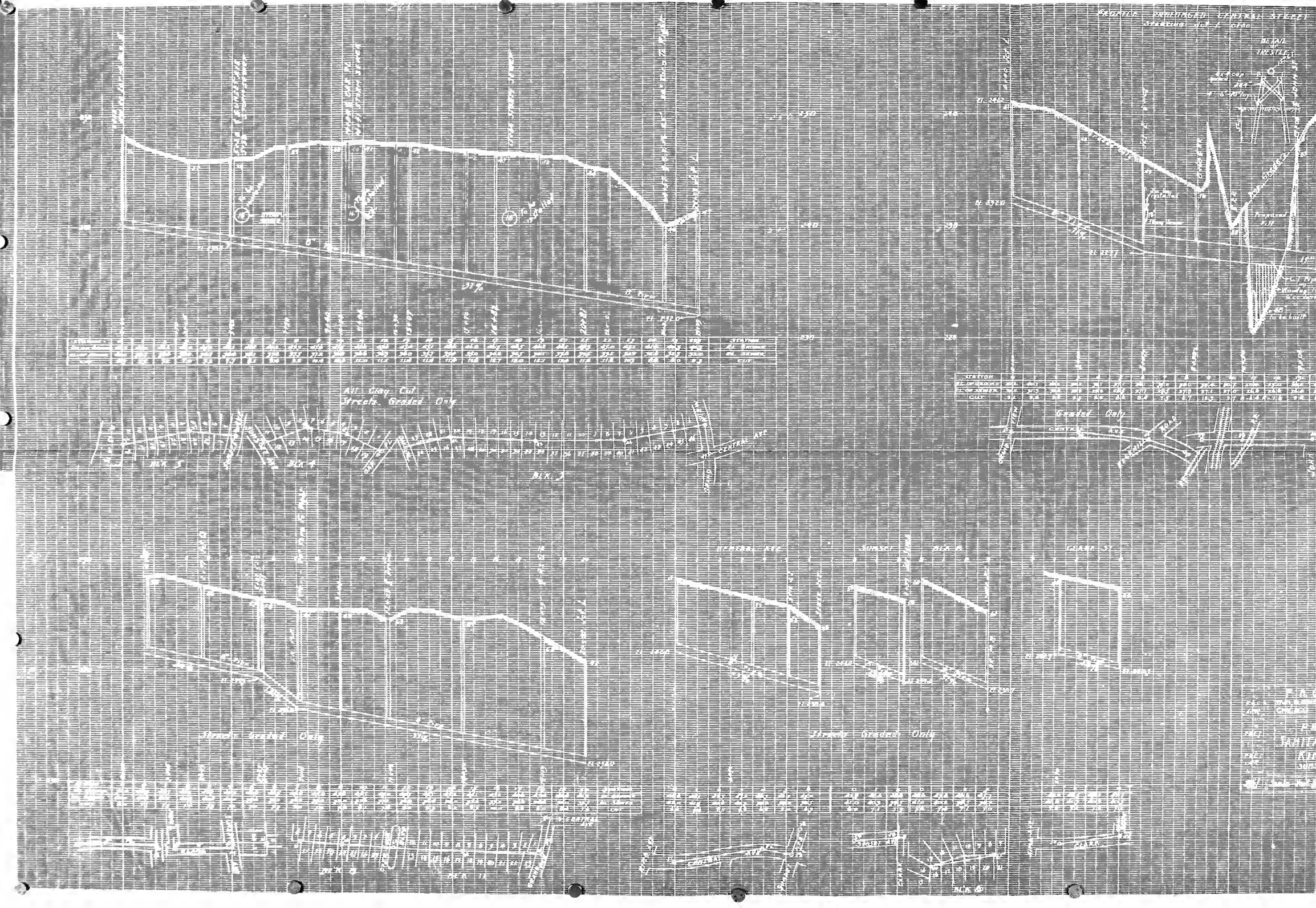

FOX
KIMBERLY CLARK COMPANY
SUNSET POINT ADDITION
KLEIHUS PLAT
KIMBERLY
AVENUE
CENTRAL
PARKWAY
SUNSET
CAMPBELL
OAK
MAIN
ELM
FIRST
SECOND
THIRD
STREET
MAPLE
BIRCH
WALNUT
PINE
WILSON
CHICAGO & NORTHWESTERN R. R.
LEGEND
EXISTING HOUSES & APARTMENTS
OFFICES & BUILDINGS OF K-C. CO.
SCHOOLS, CHURCHES, STORES, FACTORIES
MONUMENTS MARKING BOUNDARIES
CONTOUR LINES MARKING WATER
BOUNDARY LINES & SECTION LINES
EXISTING & PROPOSED PARK TREES
VALVES
HYDRANTS
BLOWOFF WITH VALVE
WATER SUPPLY PIPE LINE
KIMBERLY - WISCONSIN
GENERAL MAP - WATER SUPPLY
SHOWING WELLS, RESERVOIR AND TANK, PIPE LINES, HYDRANTS, ETC.
Scale - 1 inch = 200 feet

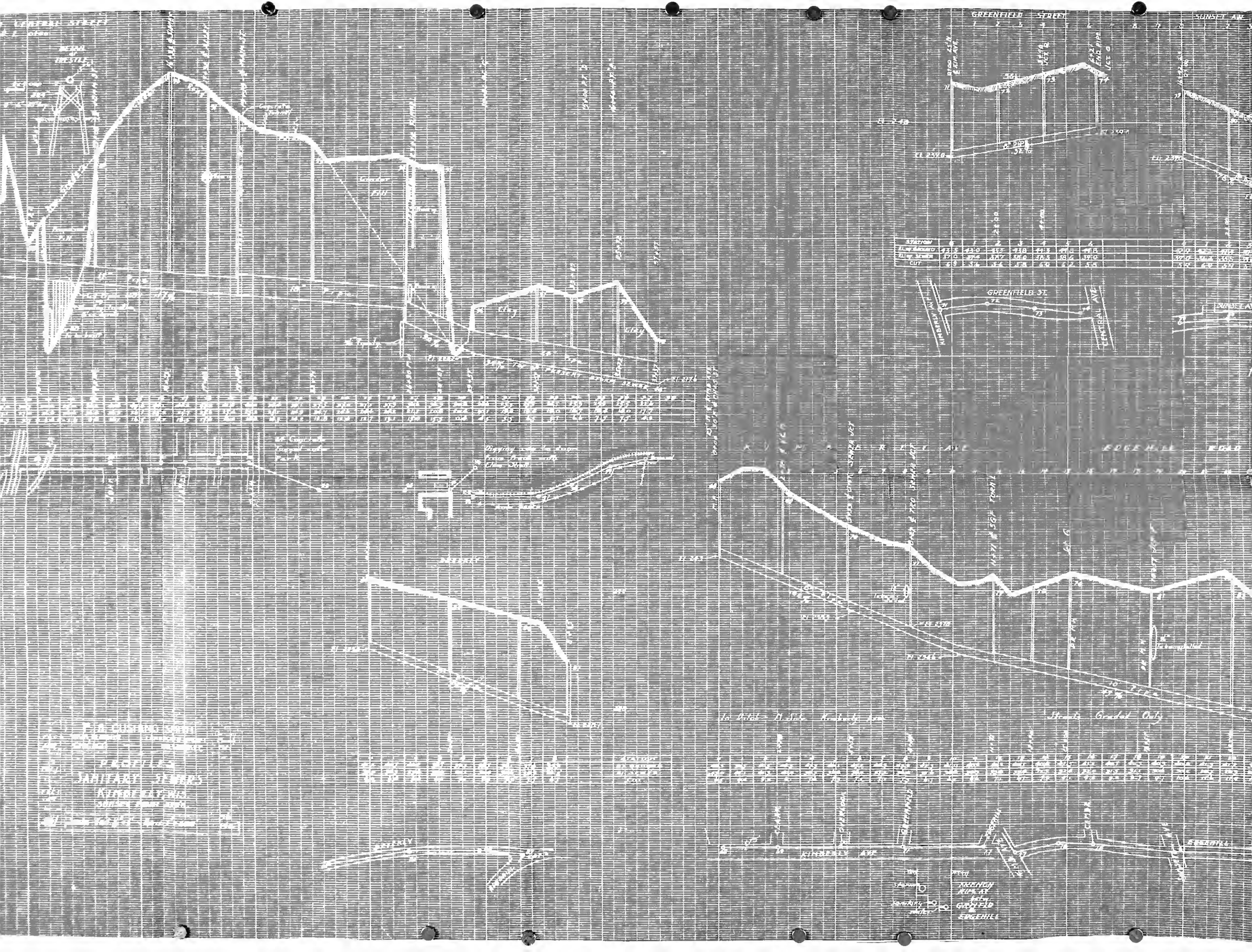

FOX
RIVER
KIMBERLY-CLARK COMPANY
HOTEL
PARK
KIMBERLY PARK WAY
CENTRAL AVENUE
SUNSET AVENUE
KIMBERLY POINT ADDITION
KIMBERLY AVENUE
FIRST STREET
OAK ST
MAIN ST
CHERRY ST
WILSON STREET
Lot 3
Lot 4
Lot 5

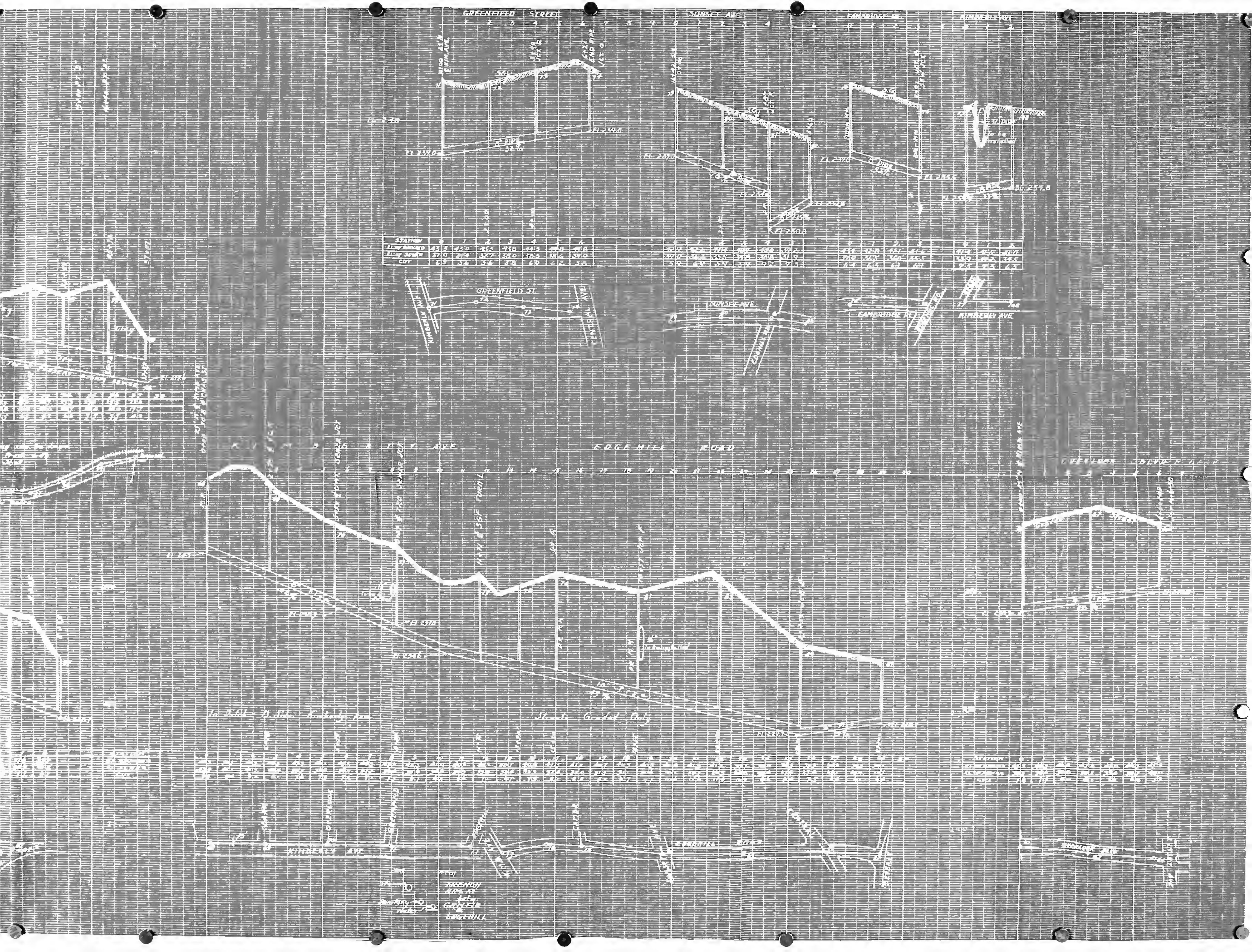

FOX
KIMBERLY CLARK COMPANY
SUNSET POINT ADDITION
KIMBERLY PLAT
CENTRAL AVENUE
SUNSET AVENUE
KIMBERLY AVENUE
FIRST STREET
SECOND ST.
THIRD STREET
MAIN ST.
EAST ROAD ST.
SIDNEY ST.
POINT ST.
WILSON STREET
CHICAGO & NORTHWESTERN R.R.
LEGEND
EXISTING HOUSES & APARTMENTS
OFFICES & BUILDINGS OF K-C CO.
SCHOOLS, CHURCHES, STORES, PARK BLDG
MONUMENTS MARKING BOUNDARIES
CONTOUR LINES MARKING ELEVATION
BOUNDARY LINES & SECTION LINES
EXISTING & PROPOSED PARK TREES
STORM SEWERS OLD VILLAGE NORTH
STORM SEWERS SUNSET POINT MAIN RUN
MAIN TAP
INLETS
SANITARY SEWERS
"Y" CONNECTION
KIMBERLY · WISCONSIN
SANITARY AND STORM WATER SEWER SYSTEMS
Scale 1 Inch = 200 Feet

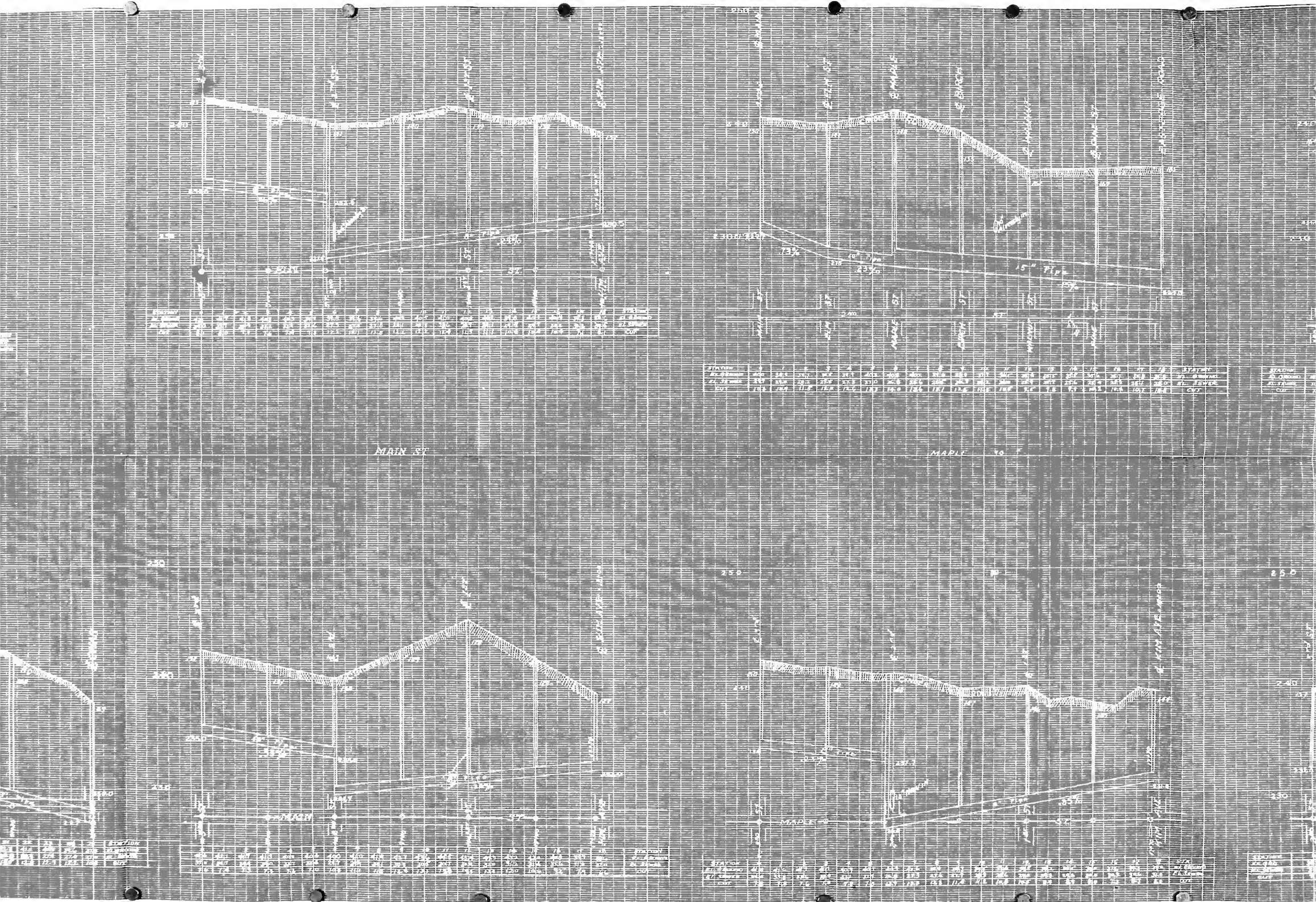


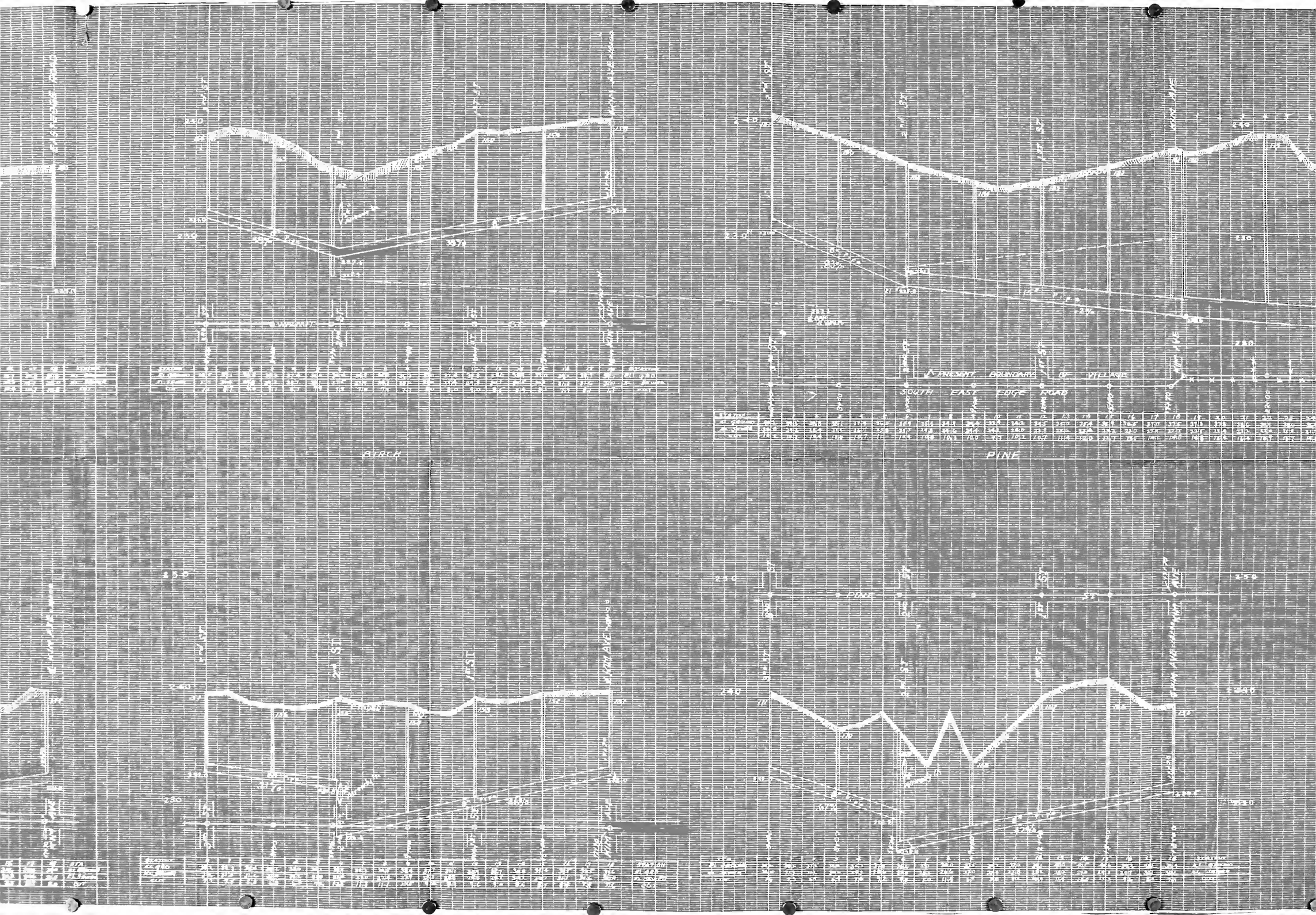







GREENFIELD STREET
SUNSET AVE
KIMBERLY AVE
GREENFIELD ST.
SUNSET AVE
CAMBRIDGE AVE
KIMBERLY AVE
EDGEHILL ROAD
STATION
CUT
Streets Graded Only
KIMBERLY AVE


MAIN ST
MAPLE


PRESENT BOUNDARY OF VILLAGE
SOUTH EAST EDGE ROAD
BIRCH
PINE